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ABSTRACT

In this teaching and curriculum guide for community health education, a design is suggested for a course that could help prevent premature deaths due to heart disease. The course communicates facts regarding the causes of cardiovascular diseases, and outlines opportunities for attaining the degree of physical conditioning essential to prevention. A model 30 week heart disease prevention course is charted. General aspects of the problem are discussed, followed by a section (optional) on how to test for risk factors. Other sections present concepts, facts, suggested approaches, and anticipated questions on such topics as the physiology of the heart and the effects of nutrition, smoking, and stress. Chapter references, mortality statistics, and a directory of New York State agencies interested in heart disease prevention, also appear. (LY)

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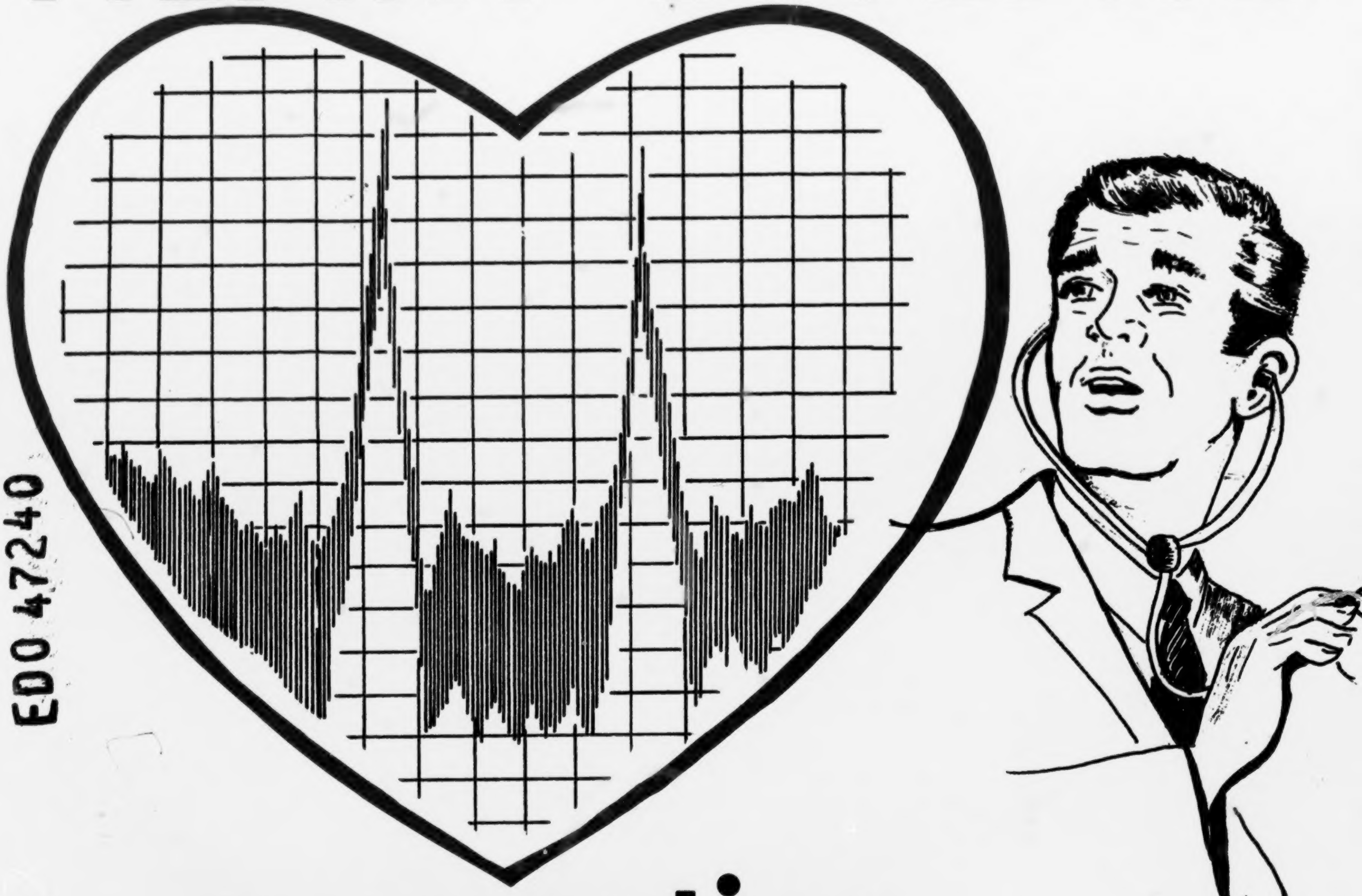

prevention programs

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THE STATE EDUCATION DEPARTMENT
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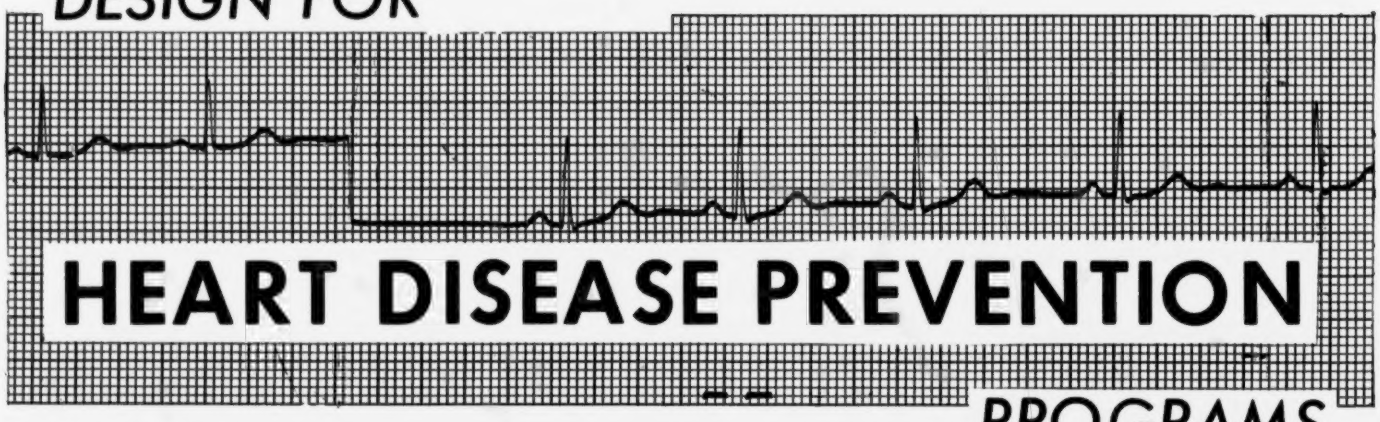

DESIGN FOR HEART DISEASE PREVENTION PROGRAMS

THE UNIVERSITY OF THE STATE OF NEW YORK
THE STATE EDUCATION DEPARTMENT
BUREAU OF CONTINUING EDUCATION CURRICULUM DEVELOPMENT
ALBANY, NEW YORK
1970

in cooperation with

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FOREWORD

The need for community-wide programs designed to prevent heart disease was first voiced by Commissioner of Health, Hollis S. Ingraham, M.D. at a conference convened at the State University of New York at Albany in the spring of 1970. At this conference Commissioner Ingraham noted the lack of large scale programs for the improvement of the health of adults, and he thus urged an immediate and comprehensive effort to meet this challenge. Commissioner of Education, Ewald B. Nyquist, present at the same conference, responded by pledging the full support of the Education Department in developing such programs.

This manual, entitled *Design for Heart Disease Prevention Programs*, is the initial evidence of that commitment being fulfilled. Appropriately, it represents the combined endeavors of personnel in both the New York State Department of Health and the New York State Education Department. James J. Quinlivan, M.D., Director, Office Public Health Information, offered invaluable guidance in the initial planning of the publication.

Nicholas G. Alexiou, M.D., Associate Director for Preventive Services, State of New York, Department of Health, prepared much of the material pertaining to the physiological aspects of the program. Ann Shea and Dorothy Nelson, also of the Division of Preventive Services contributed information pertaining to smoking and heart disease, and nutrition and heart disease. The text for the subject of stress and heart disease was written by John McGuire, Senior Public Information Specialist, Department of Health.

Lowell A. Klappholz, Senior Editor, Croft Educational Services, recommended procedures to be followed in the physical conditioning phase of the program. These procedures were reviewed by George H. Grover, Director, and Clyde Cole, Supervisor, Division of Physical Education and Recreation.

Organizational schemata that could be followed in implementing a heart disease prevention program were suggested by Joseph A. Mangano, Chief, and Harold Williams, Associate, Bureau of General Continuing Education. Irving Juster, M.D., Chief Cardiologist, Glens Falls Hospital, and originator of the Glens Falls Anti-Coronary Program read the entire manuscript and verified its technical accuracy. George K. Tregaskis, Associate, Bureau of Continuing Education Curriculum Development coordinated the total project, designed the format, and prepared the manuscript for publication.

HERBERT BOTHAMLEY, *Chief*
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MESSAGE TO THE COURSE COORDINATOR

This manual suggests a design for a course that could be instrumental in preventing premature deaths due to heart disease. The course both communicates the facts regarding the causes of this malady and provides the participants with the opportunity to attain the degree of physical conditioning considered essential in preventing the occurrence of heart disease.

Ideally, each participant will take full advantage of both phases of the program; however, the course coordinator must realize that not everyone who indicates an interest in preventing heart disease will be willing or able to invest the time necessary for such complete involvement. Some may wish to attend just the lectures and engage in the testing procedures; some may prefer to be informed of the risk factors, to be tested for those factors, and then carry on the suggested physical conditioning program at a time and place of their own choosing. Therefore, the structure of the course should remain flexible enough to accommodate any combination of the proposed activities which are elected by the participants.

It is recommended that the topics on physiology and smoking be presented by a physician; stress by a professional in the field of psychology; and nutrition by a dietician or teacher of home economics. The physical conditioning classes should be conducted by an instructor in physical education. If a group which has completed the physical conditioning activities expresses a desire to continue beyond the termination of the course, then every effort should be made to make the school facilities available to them.

A model course in Heart Disease Prevention would extend over a period of 30 weeks. The chart on page vi suggests a way of organizing this course. Mini-lectures outlining the statistics, risk factors, and preventive measures of heart disease could be presented at Adult School assemblies or community service agencies such as Rotary, Kiwanis, or the League of Women Voters. These brief talks may recruit participants for the more comprehensive program.

The topics in this program might also be considered as self-contained teaching units that could be used in other continuing education courses such as gourmet cooking, weight reduction, or a broader medical education series covering such subjects as cancer, infant care, and first aid. In addition, they might be incorporated in the health and physical education curriculum of the secondary schools.

A most promising way of promoting the course among the medical professionals of the community would be to contact a physician who is a member of the local Heart Association and encourage him to solicit the cooperation of his colleagues.

JOSEPH A. MANGANO, *Chief*
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Division of Continuing Education

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ORGANIZATIONAL CHART

Week	Session A	Session B
1	(1) Lecture: Topic one (2) Physical conditioning activity	(1) Testing (2) Testing
2	(1) Lecture: Topic three (2) Physical conditioning activity	(1) Lecture: Topic four (2) Physical conditioning activity
3	(1) Lecture: Topic five (2) Physical conditioning activity	(1) Lecture: Topic six (2) Physical conditioning activity
4	(1) Lecture on physical conditioning (2) Physical conditioning activity	(1) Physical conditioning activity (2) Physical conditioning activity
5... 30	The remaining 52 sessions would be primarily devoted to physical conditioning activities. The educational content should be periodically reinforced, especially as new evidence and literature regarding heart disease become available.	

Each session should last approximately 2 hours, so designated on the above chart as (1), (2).

THE PROBLEM OF HEART DISEASE

INTRODUCTION

Since the turn of the century, heart disease and stroke have emerged from relative obscurity to epidemic proportions. In the United States they are the Nation's number one cause of premature death, claiming more than one million lives each year. By far, they are the leading cause of morbidity and mortality in every state of the Union. The economic cost of these diseases exceeds 30 billion dollars each year.

Compared with other countries, the United States leads the world in deaths from heart disease and stroke. If the mortality rates of heart disease and stroke which prevail in Italy and Greece could be duplicated in the United States, there would be a 50 percent reduction in mortality from these diseases, with 500,000 persons being spared the effects of heart disease and stroke each year.

During the past two decades, numerous national and international studies, many of which were supported by the Heart Disease and Stroke Control Program, have identified factors which probably account for the marked differences in the rates of heart disease and stroke throughout the world. These so-called "risk factors," such as elevated blood lipids, elevated blood pressure, etc., have been shown to be exceedingly common among persons who suffer from heart disease and stroke. Studies have also indicated that persons who possess these risk factors experience high rates of heart disease and stroke. Furthermore, it has been demonstrated in clinical trials that those groups in which certain of the risk factors are favorably altered experience significantly less heart disease and stroke than those not so controlled.

These facts lend strong support to the belief that the prevention and control of heart disease and stroke are now within our grasp.

IMPORTANT CONCEPTS

- There are differences in individuals that predispose certain ones to the hazards of heart attacks.
- These predisposing factors can be identified, minimized, or eliminated.
- The facts supporting prevention of heart disease have not been challenged over time.
- It is not too late to begin to apply the knowledge which exists and which has withstood the test of time.
- Individual knowledge, education, and discipline are the keys to the prevention of heart disease.

- Motivation must come from individuals and groups interested in reducing the mortality and morbidity of heart disease.

RELATED FACTS

- Heart disease is a major public health problem of epidemic proportions.
- We have become complacent about this epidemic, accepting it for the time being as inevitable. We are willing to support research in heart disease to find a way to minimize the toll taken by this epidemic. *Yet - we have ignored what has been already learned, and what can now be applied to prevent unnecessary or premature heart disease deaths.*
- Over 50 percent of all deaths in America and in New York State are due to heart disease.
- Heart attacks (coronary heart disease, myocardial ischemia - myocardial infarction) contribute the greatest proportion of these heart disease deaths.
- Heart attacks have not always been a significant public health problem. Over the last 20 years, however, the problem has grown and now heart attacks are affecting younger men and women.
- Pathological studies of Korean War battle casualties identified the lesions of atherosclerosis in 77 percent of the young men studied. Fifteen percent of the men studied had lesions that were so advanced that they occluded 50 percent or more of the lumens of coronary arteries.
- Subsequent unpublished reports of similar investigations in Vietnam battle casualties infer that as many as 25 percent of the men had lesions so severe that 50 percent or more of the coronary artery lumen were obstructed by atherosclerosis. The implication is that there has been a change over time so that the disease process is affecting more individuals now than in previous years.
- Pathological studies are supported by epidemiologic investigations and public health mortality statistics. Clinical reports are also substantiating the incidence of heart attacks in younger people.
- Epidemiologic studies have pointed out that the risk of having heart attacks is significantly correlated with the presence of identifiable risk factors.
- Amelioration or elimination of these risk factors leads to improved outlook, can improve recovery chances after a heart attack, and can, in many cases, forestall the onset of the heart attack.
- While application of the existing medical knowledge can contribute to reducing the epidemic of heart disease deaths, there is no guarantee that the measures taken will prevent an attack.

- The preventive measures suggested have not been identified with increasing the risk of having an attack. They have been espoused by the medical profession for years as good health practices.

- The preventive measures are already available for application and are based on individual education, motivation, and action.

- The known risk factors that predispose to heart attacks are: age, sex, heredity, hypertension, diabetes, gout, stress, smoking, obesity, hypercholesterolemia, and lack of enough physical activity to keep the body in good condition.

- Subsequent lectures will consider these risk factors, their relation to heart disease, and what can be done to minimize their importance or eliminate their existence.

SUGGESTED APPROACH

A physician, a public health official, a noted director of a heart organization, a local physical educator, or a famous athlete should be engaged as a keynote speaker to spark the initial enthusiasm for the program. The keynote address should be positive in stating that preventive measures can be taken to lessen the chances of premature death due to heart disease and should further emphasize the urgency of beginning a preventive program.

The films *Odds for a Longer Life*, *Coronary Heart Disease*, and *Critical Decades* may be used to supplement the keynote address. They may be obtained, free, from the American Heart Association. In addition, the keynote speaker may wish to use the overhead projector to present the State and national statistics relating to the prevalence of heart disease. These may be obtained from the New York State Department of Health; the American Medical Association; the United States Department of Health, Education, and Welfare, or insurance companies. The following charts are examples of those which may be of interest to the participants.

Deaths From Arteriosclerotic Heart Disease And Other Myocardial Degeneration
Five Year Average (1963 - 1967)

Under 65 Years of Age

County	Both Sexes	Females	
		Number	Percent
Albany	321	82	25.5
Saratoga	84	18	21.4
Schenectady	169	39	23.1
Schoharie	23	6	26.1
Warren	52	14	26.9
Washington	52	13	25.0

Compiled by the New York State Department of Health.

Leading Causes Of Death, By Rank, United States, 1900* and 1960

1900

Rank	Cause of Death	Deaths Per 100,000 Population	Percent of All Deaths
	All Causes	1,719.1	100.0
1	Influenza and pneumonia	202.2	11.8
2	Tuberculosis (all forms)	194.4	11.3
3	Gastritis, etc.	142.7	8.3
4	Diseases of the heart	137.4	8.0
5	Vascular lesions affecting CNS	106.9	6.2
6	Chronic nephritis	81.0	4.7
7	All accidents	72.3	4.2
8	Malignant neoplasms (cancer)	64.0	3.7
9	Certain diseases of early infancy	62.6	3.6
10	Diphtheria	40.3	2.3

1960

Rank	Cause of Death	Deaths Per 100,000 Population	Percent of All Deaths
	All Causes	945.7	100.0
1	Diseases of the heart	366.4	38.7
2	Malignant neoplasms (cancer)	147.4	15.6
3	Vascular lesions affecting CNS	107.3	11.3
4	All accidents	51.9	5.5
5	Certain diseases of early infancy	37.0	3.9
6	Influenza and pneumonia	36.6	3.5
7	General arteriosclerosis	20.3	2.1
8	Diabetes mellitus	17.1	1.8
9	Congenital malformations	12.0	1.3
10	Cirrhosis of the liver	11.2	1.2

*Rates for 1900 apply to the death-registration states only.

From: Lerner, Monroe, & Anderson, Odin. Health progress in the United States: 1900-1960. Chicago and London. University of Chicago Press. 1963.

ANTICIPATED QUESTIONS

- **How early should prevention start?**

  Ideally, prevention should begin in childhood. Children should be provided with proper diets and they should be taught the hazards of cigarette smoking. They should also be taught how to maintain physical fitness and deal with stressful situations.

- **What tests are taken to determine the presence or absence of risk factors?**

  Blood tests are taken to detect sugar, anemia, uric acid, urea nitrogen, blood cholesterol, and serum lipoproteins. Physical examination procedures include measurement of vital capacity, blood pressure, auscultation of the heart, height and weight determinations, and counting the pulse beats. Some tests require special equipment such as electrocardiography; others require a history of past medical experience and response to stress.

- **How early should prevention start?**

  It is never too early to start healthy habits.

- **Is there any leadership or support for programs of heart disease prevention available?**

  There are many community resources ready and willing to cooperate with school districts desiring to offer a course in heart disease prevention.

  The local medical society, the county health department, the heart association chapter, the school personnel, their counterparts in the State government and national figures who are in charge of programs should be contacted for assistance. A director of physical education or YMCA director, a cardiologist, an internist, or the director of a coronary care unit may also prove to be valuable resource personnel for this program. A person who has survived a heart attack might be the sparking leader for others. Enthusiasm and a positive outlook are the key qualifications. Fraternal organizations, industry, or professional business groups may also be interested in adopting the program and sponsoring it.

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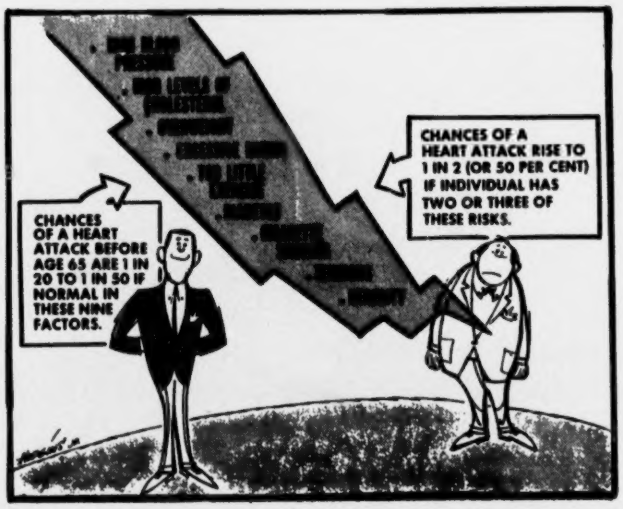

CHANCES OF A HEART ATTACK BEFORE AGE 65 ARE 1 IN 20 TO 1 IN 50 IF NORMAL IN THESE NINE FACTORS.
CHANCES OF A HEART ATTACK RISE TO 1 IN 2 (OR 50 PER CENT) IF INDIVIDUAL HAS TWO OR THREE OF THESE RISKS.

The risk of having a heart attack is significantly correlated with the presence of identifiable risk factors.

TESTING FOR RISK FACTORS

INTRODUCTION

Note: Some school districts may feel that they would like to offer all the phases of this program except testing; some individuals may feel that they would like to be involved in all phases of the program except testing. Therefore, the testing phase of the program should be considered strictly optional.

Am I likely to suffer a heart attack? What sort of risk factors do I have? Can I eliminate or reduce these factors? How?

These are basic questions each individual will ask himself when he becomes concerned about prevention of heart disease. The answers are best provided on an individual basis by private physicians who base their answers on a knowledge of the individual's past medical history, present physiologic status, and present style of life.

This information is derived from a medical history review, a physical examination, and the results of certain laboratory tests. The collation of all this information in the doctor's hands enables him to evaluate the risk factor status of an individual and to recommend a course of action or a program of prevention. A counseling session is required to review this information and to explain the rationale for particular recommendations.

IMPORTANT CONCEPTS

- There are a series of established coronary risk factors which are known to be significantly related to greater risk of having a heart attack.
- The risk factors can be determined by a medical evaluation made by a physician.
- Medical history, present habits and activity, present physical condition, and laboratory tests help identify those risk factors.
- A medical record provides for details elicited from the individual.
- A counseling session is required to transmit the results of tests and the basis for the recommendations of the physician.

RELATED FACTS

- Each testing program provides for recording of some basic identifying information, such as name, age, sex, address, and name of family physician. Next, there is a short medical history geared to elicit past medical experiences and previous heart illness. Family history of cardiovascular disease, diabetes, or gout is recorded. Finally, a history of the present state of health and symptoms, if any, determines incipient disease, response to stress, personal habits, dietary patterns, and adjustment to environment and society. This information is compiled for subsequent review in a counseling session.

- The next aspect of a testing program involves a physician's medical examination, or a series of tests, performed by technicians. These results are reported to the physician for his synthesis. A description of the testing program and the reason for the tests selected follow.

Height is measured as a parameter of the relative nutritional status. This index is correlated with *weight* to ascertain whether a person is within or outside physiologic health limits for his age and sex. His values can be compared to normal standards found in published tables and graphs. Height and weight also identify the somatotype of the person. Certain body types (mesomorphs) have a higher incidence of heart attacks.

Blood pressure is measured at rest and after exercise to note the body responses to stress. These results are also compared with standard published tables of normal and abnormal. Low blood pressure may be a sign of chronic illness, anemia, or a poor heart condition. High blood pressure may be a sign of hormonal imbalance, stress, tension, or kidney disease.

The *electrocardiogram* is taken to record heart action, rate, and rhythm. It often reveals undetected abnormalities or evidence of previous heart damage. Usually this electrocardiogram or ECG is taken while the person is in a relaxed state, in a reclined position. More recently, however, stress electrocardiograms have been taken to measure the effect of a standard stress such as stepping up on a stair 30 or 40 times.

Vital capacity or *lung function* is measured to determine capacity for oxygenation and reserve for exercise or stress purposes. Forced vital capacity is measured to establish whether any obstructive pulmonary disease is present. Smoking and lack of physical activity will reduce this vital capacity.

A *chest x-ray* may be taken to enable the physician to visualize the lung fields and heart size. This test can reveal evidence of tuberculosis, cancer, or a tumor.

A *blood sample* is drawn for several important tests.

- The *hematocrit* is recorded for determination of presence or absence of anemia.

- *Blood cholesterol* and lipid level are measured because high cholesterol levels are associated with greater risk of heart attacks.

- *Blood urea nitrogen* level gives an indication of kidney function.

  - *Uric acid* level can detect or exclude the condition called gout. Persons with high levels of uric acid are prone to heart attacks.
  - *Blood glucose* level establishes the person's status in regard to diabetes. Diabetics are also prone to heart attacks.
  - *Blood test for syphilis* is a valuable routine test. Syphilis infections can seriously damage the heart.

- If any of these tests are unusual or abnormal, further procedures and tests can be taken to confirm the presence or absence of a condition. The important part of any testing program, however, is the last. This is where the individual tested sits down with his physician and all the results are reviewed. The counseling that follows uses all the data from the history, the physical examination, and the laboratory tests. If all tests are normal, the person is generally in good health. He can participate in programs or activities that will extend his good risk status. If any tests are not normal, a modified intervention program can be prescribed to lower the risk factor status of an individual. Often, the abnormality can be corrected.

SUGGESTED APPROACHES

A risk factor testing program can be conducted on an individual basis in the private physician's office. Alternatively, the various interested community groups can organize their resources and conduct a screening program and open it to the public or to persons enrolling in some prevention program. The Heart Association, YMCA, the school, a medical society, the hospital, or the Health Department can be the prime sponsors with others contributing to the testing program wherever possible. The experience of others can be used to help predict and circumvent some of the problems of such a program.

A school gymnasium or a church hall, the health suite of a school, or the outpatient clinic of a hospital may serve as the location of the testing clinic. The equipment for tests needed can be recommended by the State Health Department's Bureau of Chronic Disease and Geriatrics. This bureau should be contacted for assistance in setting up a testing program.

Volunteers can be useful to help reduce the cost of the testing program. The school nurse or school physician can take responsibility for the program. However, if the important phase is the actual counseling that follows after testing, and if physicians are to be asked to approve a program and send their patients to participate, then the medical society should be involved in the planning.

ANTICIPATED QUESTIONS

- Which tests should be taken?

  The ones which lead to identification of known risk factors.

- **How many persons can be tested in one day?**

  It depends on the organization that is set up — anywhere from 5 to 6 per day to 200 per day.

- **Are there medical legal hazards related to testing?**

  Yes. Therefore, let your medical society representative help you plan.

- **What should the cost be?**

  The cost varies with the number of tests performed and the extent to which volunteers do the testing and help the program along. On an individual basis, in the private purchase market, the cost could be up to $65 or more for the usual tests.

- **Where can forms be obtained?**

  The New York State Health Department offers a form, free, or a school district may wish to devise its own. A sample form is provided below.

SUGGESTED PROTOCOL

SCREENING FOR CORONARY PRONE PERSONS

I. Identifying Data: Name, age, sex, race, occupation, social security number, name and address of place of employment.

II. Information For Referral:
- *(a) Name, address, telephone number of personal physician or clinic, neighborhood health center, or health care facility used.*
- *(b) When last seen by a physician?*
- *(c) Signature of agreement to participate in screening program and release of results to physician.*

III. Personal Information (Self-Completed)

1. Have you ever been told you had angina or coronary disease? *Yes__ No__*

2. Have you ever had a heart attack? *Yes__ No__*

3. Have you ever been told you have kidney trouble? *Yes__ No__*

4. Have you ever been told you have high blood pressure? *Yes__ No__*

5. Have you ever been told that you had a stroke? *Yes__ No__*

  (a) Have you ever suddenly been unable to speak clearly? *Yes__ No__*

  (b) Do you have frequent fainting or blackout spells? *Yes__ No__*

6. Are you currently taking medicine for:

(a) High blood pressure? Yes__No__

(b) "Sugar" diabetes? Yes__No__

(c) Heart disease? Yes__No__

(d) Lung disease? Yes__No__

(e) Kidney disease? Yes__No__

(f) Any other disease? Yes__No__

7. Do you smoke cigarettes? Yes__No__

(a) How many cigarettes do you smoke a day?___

(b) How many years have you smoked? ___

IV. Family History (Self-Completed)

1. Father: Living____ Dead____ Present age____ Or age at death____
Cause of death________________

Mother: Living____ Dead____ Present age____ Or age at death____
Cause of death________________

Number of Sisters: Living____ Dead____

Number of Brothers: Living____ Dead____

2. Have any members of your family had, or do they now have?

	(a) Heart Disease	(b) Sugar Diabetes	(c) Stroke	(d) High Blood Pressure
Mother	________	________	________	________
Father	________	________	________	________
Sister(s)	________	________	________	________
Brother(s)	________	________	________	________

V. Clinical and Laboratory Results

History: Questionnaire completed

Sex M F Age____years

Height (shoes off) _____inches; Weight____lbs. (indoor clothing)

Blood pressure (supine position) R arm______ L arm _______

Serum Glucose (Casual) _____________ mg/dl.

Serum Cholesterol ________________ mg/dl.

Glycosuria Yes____ No____

Proteinuria (1+ or more) Yes____ No____

ECG Normal________ Abnormal________

(If ECG is abnormal, a 12 lead ECG is taken for record and transmission to physician).

In addition, the Coronary Risk Estimate form developed by the Chemung County Heart Chapter could be used by the physician during the counseling session. A copy of this form is provided on the next page. This form may be duplicated and distributed to the participants with the following instructions.

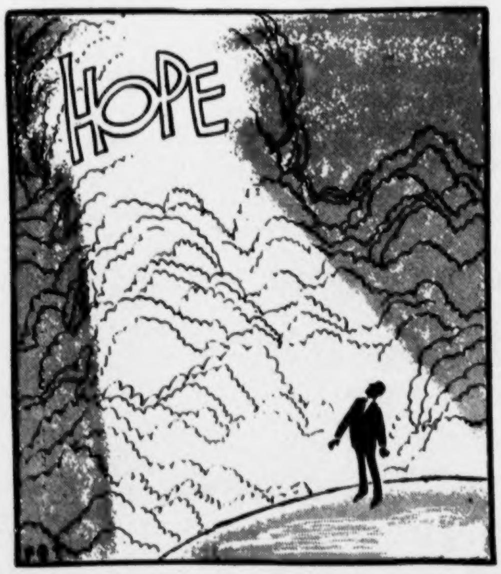
The Heart Chapter wants to help you prevent a possible heart attack. This examination is voluntary on your part and will require only a few minutes of your time. A report of the results will be sent to you and your doctor.

Please fill out the attached form as follows:

- *Your name and address*
- *Your doctor's name and address*
- *Also circle the block which pertains to you in each of the following: age, heredity, tobacco smoking, exercise, and sex.*

The remainder of this form will be filled out at the time of testing.

Of the eight risk factors, 5 (3 through 7), are controlled by the individual. The testing may indicate that certain of these factors unnecessarily increase your risk. In this case you and your physician will plan together a program to prevent YOUR heart attack. Remember, CORONARY HEART ATTACKS can be prevented.



DATE

NO.

CHEMUNG COUNTY HEART CHAPTER
BRANCH OF SOUTHERN TIER HEART ASSN.

CORONARY RISK ESTIMATE

NAME ______________________

ADDRESS ______________________

CITY, ZIP ______________________

DOCTOR ______________________

ADDRESS ______________________

CITY, ZIP ______________________

							Score
AGE	1 10 to 20	2 21 to 30	3 31 to 40	4 41 to 50	6 51 to 60	8 61 and over	
HEREDITY	1 No known history of heart disease	2 1 relative with cardiovascular disease Over 60	3 2 relatives with cardiovascular disease Over 60	4 1 relative with cardiovascular disease Under 60	6 2 relatives with cardiovascular disease Under 60	7 3 relatives with cardiovascular disease Under 60	
WEIGHT	0 More than 5 lbs. below standard weight	1 —5 to +5 lbs. standard weight	2 5-20 lbs. over weight	3 21-35 lbs. over weight	5 36-50 lbs. over weight	7 51-65 lbs. over weight	
TOBACCO SMOKING	0 Non-user	1 Cigar and/or pipe	2 10 cigarettes or less a day	4 20 cigarettes a day	6 30 cigarettes a day	10 40 cigarettes a day or more	
EXERCISE	1 Intensive occupational and recreational exertion	2 Moderate occupational and recreational exertion	3 Sedentary work and intense recreational exertion	5 Sedentary occupational and moderate recreational exertion	6 Sedentary work and light recreational exertion	8 Complete lack of all exercise	
CHOLES-TEROL	1 below 180 mg.%	2 181-205 mg.%	3 206-230 mg.%	4 231-255 mg.%	5 256-280 mg.%	7 281-300 mg.%	
BLOOD PRESSURE	1 100 upper reading	2 120 upper reading	3 140 upper reading	4 160 upper reading	6 180 upper reading	8 200 or over upper reading	
SEX	1 Female	2 Female over 45	4 Male	5 Bald male	6 Bald short male	7 Bald short stocky male	
						Total	

IF YOU SCORE:

6 - 11	Risk well below average
11 - 17	Risk below average
18 - 24	Risk generally average
25 - 31	Risk moderate
32 - 40	Risk at a dangerous level
41 - 62	Danger urgent. You must reduce your score.

THE PHYSIOLOGY OF HEART DISEASE

INTRODUCTION

The human heart is a remarkable pump capable of steadily performing its job of circulating the blood of the body under all conditions, 24 hours a day, year in and year out. There is no reason why it shouldn't continue to beat for a hundred years or more if all goes well and its needs are adequately met.

The causes which affect the efficiency, strength, and durability of the heart pump are sufficiently well known to enable physicians to monitor them and in most instances to correct the underlying problem. This monitoring and correcting work of physicians is most often performed in "coronary care units" of hospitals.

One of the items that is monitored, is the heart initiated electrical impulses that precede the contraction of the muscle. The rate of contraction and strength of heart muscle contractions are established by the electrocardiogram. The effect of chemicals, drugs, and hormones on the heart are thereby measurable. Even simple elements like oxygen, sodium, potassium, calcium, and magnesium can affect the action of the heart muscle and play an important role in its physiology and function.

Under certain conditions, therefore, the heart can be seriously affected in its function by a variety of factors. There are certain things an individual should and can do every day and other things he should refrain from doing because of their effect on the heart.

He should get adequate rest - but exercise daily. Each person should get adequate rest every day to restore his expended energy balance. Too much rest, on the other hand, leads to deterioration of function through atrophy of disuse.

He should exercise daily - but not overexert himself. A prudent amount of physical activity is required every day to maintain vigor and muscle tone.

He should eat proper foods - but in the right amount. Diet supplies us with the calories we need for energy expenditure and rebuilding of wornout cells and body proteins. Too many calories, however, lead to excessive storage in fat depots in the body, to obesity and overweight. This in turn, leads to excessive work output to perform a particular task and, over an extended period of time, places an undue strain on the heart.

He should work and play - but avoid prolonged stress. In every working day there are different tensions and stresses that we are called upon to handle. These tensions can become more than we are able to tolerate, and hypertension ensures. This is noted as fatigue, irritability, inability to smile, and to relax and laugh. It also is manifested as increased blood pressure. This tension can be measured chemically in elevated concentrations of certain chemicals and hormones in the circulation. Each person should know where his emotional problems stem from and find a way to live with daily problems.

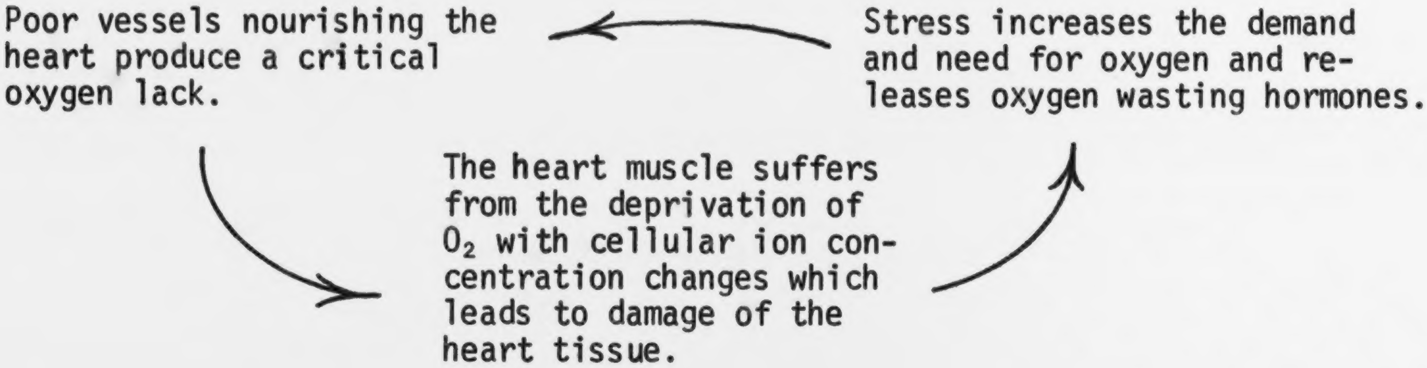
He should not smoke. This adversly effects the cardiovascular and pulmonary systems.

Each of these activities has a basic effect on the function of the heart.

The interrelationships between these various risk factors have been organized to rationally explain their pathologic physiology on the function of the heart.

Lack of physical activity leads to poorer heart muscle efficiency. This leads to wasting of available oxygen supplies in the circulation. When under stress, the heart is required to pump harder. If the coronary arteries are unable to dilate or expand to nourish the heart in its increased work load, there will be a shortage of available oxygen. This shortage is exaggerated if there is simultaneous excess amounts of the stress hormones, epinephrine and norepinephrine, in the circulation. The end result is serious heart injury.

Smoking also seems to be able to increase the blood level of the stress hormones, catecholamines, which act unphysiologically in the presence of increased work load requirements and poor coronary artery expanding ability. Lifelong diets high in animal fats (saturated) contribute to the development of sclerotic coronary arteries which sooner or later in life are unable to expand to carry the needed circulation and oxygen for the periods of stress. A vicious cycle is generated.



Poor vessels nourishing the heart produce a critical oxygen lack.

Stress increases the demand and need for oxygen and releases oxygen wasting hormones.

The heart muscle suffers from the deprivation of O_2 with cellular ion concentration changes which leads to damage of the heart tissue.

The prevention of heart attack then logically rests on breaking or altering the cycle.

First, prevent the oxygen lack, by exercise, proper diet, treatment of hypertension, and lowering of elevated cholesterol and other blood lipids which predispose to artherosclerosis and "poor vessels."

Second, prevent oxygen wasting, through physical conditioning, nonsmoking, and environmental relaxation. This improves the oxygen handling capacity of the body and reduces the concentrations of catecholamines, epinephrine, and norepinephrine.

Coincidentally, laboratory research verifies that these preventive measures identify the well known coronary risk factors popularized in large scale epidemiological studies as associated with a high frequency of heart attacks. These "risk factors" are smoking, lack of physical exercise, hypertension, overweight, high blood cholesterol levels, and stress.

A proper prevention regimen for each individual begins at the doctor's office where a medical evaluation can be conducted. From the knowledge gained by the medical history, the physical examination, the electrocardiogram, and the laboratory tests, the physician can recommend and prescribe the diet and the activity required to correct any imbalance that exists and advise what is needed to stay in good health. The discipline of adhering to the prescription is an individual decision.

IMPORTANT CONCEPTS

- Although all the physiologic facts that lead to heart attacks are not clearly understood, there is enough evidence accumulated to date to provide a logical basis for the recommendations that have been made.

- When all facts are not clearly understood, there is room for differences of opinion and the opportunity for more research. Disagreement and hesitation on some of the items can be expected.

- In some individuals, heart attacks cause premature death and in others, heart attacks do not seem to affect longevity and robust living.

- The time to take preventive measures is before the attack, or when the individual is young enough to retard any normal deterioration process. However, even after a heart attack, there is something the individual can do to improve his risks of a second attack.

- The heart is much like muscle tissue elsewhere in the body--it needs to perform work to stay in optimum condition. Lack of use leads to atrophy.

- The heart muscle, like any other muscle, can be damaged by injury, poisons, inadequate circulation, infection, lack of oxygen, and by loss of essential cellular ions.

- The heart differs from other muscle tissue in its inherent contractile qualities and its exclusive electrical impulse conduction system that regulates its smooth regular beat. This system allows optimal function capacity.

- Certain stimuli to the heart can affect the efficiency of the function of the heart muscle, and affect the rate of heartbeat. These stimuli include workload, stress, hormones, electrical impulses, blood volume, concentration of blood cells, blood supply to the heart muscle, and available oxygen supplying the heart muscle. Drugs such as nicotine and caffeine can also affect the performance of the heart.

- Heart malfunction can occur imperceptibly. Heart attacks are not always dramatic events. Although many are painful, many occur silently.

- Exercise places a stress or workload on the heart which strengthens the tone of the muscle, increases the heart muscle cell length, and improves its contractile force and efficiency.

- A heart in good physiologic state, working efficiently, beats slower at rest than an "untrained" heart.

- A heart that is in a good physiologic state can circulate blood through the body at a slower heart rate and lower blood pressure and do so more efficiently in terms of work or caloric expenditure, than an unexercised heart.

- Hundreds of heart beats a day are conserved by the action of an exercised strong heart versus the unexercised or unphysiologic heart.

- A heart that is exercised regularly is provided with a rich circulation and an adequate supply of oxygen.

- An exercised heart is not as susceptible to sudden stimuli from stress hormones which can otherwise cause a rapid,serious change in rhythm.

- The prognosis after a heart attack is much improved if the person had been physically fit before the attack. The recovery is shorter, and the extent of the tissue damage, much less.

- After a heart attack, exercise is prescribed as a way of improving general circulation and strengthening the heart in its recovery.

- Epidemiological studies of total populations and of insurees indicate that habitually physically inactive subjects have a 200 percent greater risk of developing coronary heart disease than physically active subjects.

- The beneficial effects of training have been produced primarily by improvement in the hemodynamic response to exercise.

- Improvements have been shown in subjective well-being and reduction of frequency of angina pectoris (heart pain associated with effort) in persons who have exercised on a regular basis.

- An exercised heart maintains a good circulation at a lower blood pressure, has a larger stroke volume (output per beat), slower pulse rate, and has an improved oxygen uptake above pretraining levels.

- In half of all heart attacks, there is no evidence that obstruction of the coronary arteries caused the attack. Heart attacks can occur with or without obstruction of coronary vessels.

- Exercise and proper diet can improve the vascular supply to the heart and reduce the chances that a heart attack will be caused by an obstruction from atherosclerosis.

RELATED FACTS

- The heart is like other muscle tissue in the body in that it must perform a minimum amount of work to stay in good physiologic condition.
- Many things can damage the heart muscle. Oxygen lack, electrolyte imbalances, hormone deficiency or excess, infection, direct trauma, and poor circulation to the heart muscle are the most damaging.
- Many heart attacks occur which are not painful or otherwise symptomatic.
- Heart attacks occur without evidence of closure of coronary arteries by arteriosclerotic placques in these arteries.
- Heart attacks can be prevented by eliminating the known risk factors and by continuing lifelong programs of diet, exercise, and life style changes that offset the noxious environmental stimuli associated with heart disease.
- Heart function is closely related to the physiological function of the respiratory, digestive, excretory, nervous, and endocrine gland systems.

SUGGESTED APPROACHES

The physiology of heart disease needs simple, clear explanations. The lecturer must proceed logically in detailing the scientific facts that relate to heart attacks and the basis for preventive programs. A review of the anatomy and function of the heart is basic to such a discussion. Use of anatomical drawings, films, electrocardiographs, and slides are most helpful.

Many elementary and secondary schools now teach basic health curriculums which include units on the heart and the vascular system. The course instructor could assign portions of such units for students to report on to parents at the adult education session. This basic information could then be expanded on by the biology or science instructor, the physician, the college professor, the laboratory scientist, or the epidemiologist. In a similar manner, the physical educator could assign reading and have reports presented on the benefits of physical conditioning through exercise. The home economics department could make a presentation on diet and heart disease and food selection and preparation. Similar reports by students can be made in conjunction with their studies on the harmful effects of tobacco.

The entire physiology subject can be as abbreviated or expanded as the course director thinks will satisfy the needs of the participants.

Actual demonstrations of the effect of drugs, exercise, and training can be performed in the classroom.

- Laboratory animals can be injected with hormones like epinephrine to demonstrate the effect of drugs on the heart rate.
- Blood pressure and pulse reading sessions can be conducted before and after exercising, smoking, or drinking coffee.

- A broken arm or leg in a cast gives the opportunity for the instructor to demonstrate weakness of muscle and atrophy of muscle through lack of use. The pain of starting to move injured limbs when the cast is removed can be likened to the pain of angina pectoris.

- A great deal of free time should be allowed for questions and answers that will clear up apprehensions and old misinformation.

- A psychiatrist can be called on to relate the physiologic facts of stress.

ANTICIPATED QUESTIONS

- Does elimination of all known risk factors insure against a heart attack?

  No. All the factors that precipitate an attack are not known at this time. Furthermore, each of the important determinants of a heart attack will have a different significance for each individual.

- Don't all people have to die at some time and isn't a heart attack as good a way to go as any?

  Yes, death is inevitable for all of us, but we do not consider premature death from a heart attack a desirable goal.

- Doesn't stress from exercise increase the risk of heart attacks?

  Only under certain conditions -- notably in the sudden stress of an unconditioned, physically unfit individual. Actually stress testing under controlled conditions of people who have had heart attacks has been found very safe. Proper conditioning is essential. Clinical physiologists generally deny a relation of effort to acute myocardial infarction.

- Is there any evidence that exercise programs may be harmful and will increase mortality if applied on a wide basis?

  No. As a matter of fact, it can be said with reasonable certainty, that even the mortality rate of physically conditioned coronary subjects is lower than subjects who do not undertake such a program. Certainly there are no harmful effects on the normal subjects.

- Why are males at greater risk? Aren't all hearts the same?

  Starting from a genetic basis, males are generally more susceptible to injury. Their exposure to injury and stress is different from females, and their responses are different to similar stresses. Even at the cellular level, there are chromosomal differences between males and females.

- Are isometric exercises valuable?

  They are not harmful to young folks or well-conditioned older folks, but individuals at high risk would be in serious jeopardy if they attempted to improve their cardiovascular fitness through isometric exercises.

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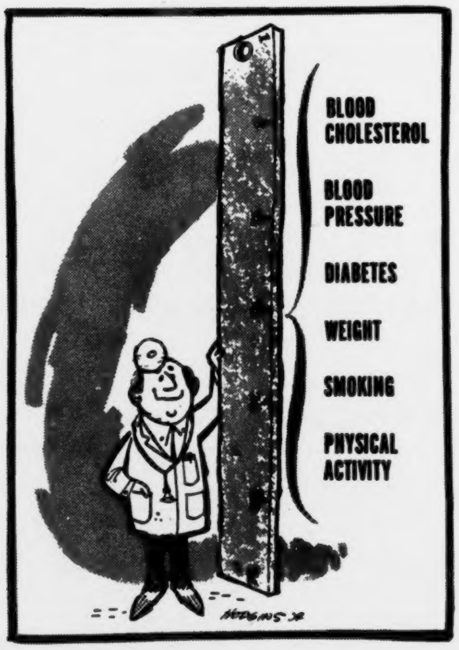


The cardiovascular fitness of an individual can be assessed by a physician.

NUTRITION AND HEART DISEASE

INTRODUCTION

Many of the causes of the degenerative diseases of middle age which strike adults in an affluent society lie in a type of malnutrition characterized by an overconsumption of calories coupled with a lack of wisdom in food choices. This imbalance of diet, underexercising, and failure to develop habits which combat the effects of a sedentary existence constitute a special problem for a tremendous segment of the population.

Statistics show that the obese have increased susceptibility to diabetes, hypertension, angina, sudden death, gall bladder malfunctions, arthritis, pulmonary dysfunction, and social disability. They also suffer from increased complications and have a greater mortality from surgical procedures.

Since scientific studies provide increasing evidence of the importance of diet, the American Medical Association Council on Food and Nutrition recommends that physicians provide counseling on diet modifications.

IMPORTANT CONCEPTS

Treatment - general The successful treatment of obesity must involve far-reaching changes in life style. These changes include alterations of dietary patterns and patterns of physical activity. The study of past efforts at treatment of obesity reveals that such changes in life style can only be achieved by individuals who are highly motivated.

Promising areas for further investigation include physiological and biochemical studies of weight regulation, including the effects of physical activity, and the study of the modification of behavior (behavior therapy).

Treatment - children Infancy and childhood can be a focus of preventive and therapeutic concern because of the persistence of dietary and exercise practices established in youth, the particularly deleterious effects of juvenile-onset obesity, and the growing evidence that the origin of atherosclerosis and hypertension may occur early in life.

Special attention should be directed toward obesity in children. Juvenile-onset obesity presents special metabolic and psychological problems. It also presents specific problems of therapy. For obese children of age 12, the odds against being normal weight adults are 4 to 1 and if weight reduction does not occur by the end of adolescence these odds rise to 28 to 1.

Drugs The use of thyroid preparations for those with no clear disorder of the thyroid, the use of cardiac glycosides in those without congestive heart failure, the use of diuretics in those with no demonstrative disturbance of water or electrode balance, and finally, the excessive use of amphetamines and related psychoactive drugs can have harmful and lasting effects.

Starvation diets Unusual or even bizarre dietary programs, including starvation, can produce dramatic immediate results. *It is clear, however, that the best and most effective results occur with a balanced diet of the usually available foodstuffs but with a decrease in total calorie intake of a type that can be used both for weight reduction and for the maintenance of lower body weight after reduction has been achieved.*

Self-help groups The aim of any responsible program should be to provide the facts about obesity and to combat misinformation and faddism. The program should emphasize the prevention of obesity beginning early in life and at those stages of life in which the onset of obesity commonly occurs.

The apparent effectiveness of self-help groups in the treatment of chronic disorders, in particular Alcoholics Anonymous for alcoholism and TOPS (Take Off Pounds Sensibly) for obesity, suggests that this approach merits careful study.

Cardiovascular disease and diet High blood pressure is the most common cardiovascular disease. An estimated 21 million American adults have it to some degree. Only physicians can diagnose hypertension and recommend an appropriate regimen, including dietary measures, for its control and prevention.

Moreover, hypertension is a factor in increasing the risk of death from coronary heart disease and stroke, two of the leading causes of death, as well as from kidney diseases.

Many people are not aware that they have hypertension, that the disease is much more common in those who are obese, and that weight reduction is usually beneficial in its management.

Currently, the cause or causes of hypertension cannot be identified in most cases. Obesity is a major risk factor in hypertension and its prevention and control is therefore important in this connection.

It is also known that restriction of salt intake is beneficial in many patients with hypertension. Evidence has been accumulating that high intakes of salt from infancy onward may be an important factor in initiating and aggravating hypertension, particularly for those with a family history of hypertension, and those who already have the disease.

Dental health and diet Dental health of adults is determined to a large extent by the nutrients ingested, personal oral hygiene, and preventive dental services experienced during infancy and childhood. For example, if a child is provided a balanced diet, devoid of excess sugar but containing fluoride in optimal amounts, dental caries experienced in a lifetime will be minimal.

A second major dietary factor affecting dental decay is the amount, type, and frequency of sugar ingestion. The effect of sugar is one of promotion of decay by nurturing dental plaque bacteria. Candies that remain in the mouth for extended periods and contain sticky or crystallized sugars are the greatest offenders. They initiate and extend the carious process, if ingested frequently between meals.

Alcohol and diet: relation to degenerative diseases of the liver and other organs Recently available evidence reveals that alcohol now provides an average ranging from 10 percent to 20 percent of the total calories consumed by adult North Americans. Therefore, alcohol is now an important source of dietary calories.

Although rich in calories, alcoholic beverages are almost devoid of all known essential food factors and vitamins. By virtue of the dilution effect of their nutritionally empty calories, alcohol-containing beverages can disrupt the balance of essential food factors and total calories, to harmful limits. Undesirable results of such dilution may include disruption of the maintenance of normal function and structure of the liver and less often of the nervous system or of the heart. Cirrhosis (largely associated with alcohol consumption) now ranks fifth as a cause of morbidity and mortality.

Forbidding the consumption of alcohol-containing beverages (prohibition) has been clearly demonstrated to be impractical. Therefore, the objective is to educate those who drink to compensate nutritionally for their empty calories that they get in significant amounts by the consumption of even so-called socially acceptable amounts of alcoholic beverages.

Exercise It is of the utmost importance that lifelong habits of regular exercise for the maintenance of optimal physical condition be established during school and college years. Physical education programs must be designed to maintain major emphasis on the participation of all young people in physical activities rather than on organized athletic programs for the relatively few physically superior students. Special programs for the obese or otherwise physically handicapped child must be provided. The results of all these programs should be evaluated through followup studies to insure that the implementated recommendations have been effective. Since exercise is a way of spending calories, discussion of its effects has a place in a unit on diet control.

RELATED FACTS

Life Expectancy

- The general level of American fitness is too low. The United States is 18th in life expectancy for men and 10th for women.
- A young man today has only 6 years greater life expectancy than his grandfather.
- The United States leads the world in deaths per capita from cardiovascular disease. In the over 35 group, this disorder accounts for 1 out of every 3 deaths. About 250,000 persons die prematurely (before 65) of some kind of heart disease.
- The white American male is more prone to coronary disease than his wife or his non-white neighbor.

Cholesterol

- In the relationship between diet and coronary heart disease around the world, the amount of the disease and the level of serum cholesterol of the population are in direct ratio.
- Research as early as 1913 showed a connection between a high-fat diet, cholesterol, and artery disease. Cholesterol cannot be demonstrated as a cause but it is often an ominous factor.
- The liver, assisted by other organs, is a manufacturer of cholesterol. Research is now turning its attention to this factor and other fat-producing body functions.
- Cholesterol is a fat found in the digestive bile. When deposited on the lining of the arterial walls, it reduces the flow of blood to the heart tissue.
- Certain foods, such as fatty meats or dairy products increase blood levels of cholesterol.
- Eating habits ultimately affect the coronary arteries' ability to supply oxygen.
- Less animal fat and cholesterol in the daily diet can help to protect coronary arteries from atherosclerosis.
- Chemical research shows three types of fats, each having a different effect on the human body.
    - *Saturated fats* raise the cholesterol level.
    - *Monounsaturated fats* seem neutral in their effect on cholesterol.
    - *Polyunsaturated fats* have an apparent cholesterol-lowering effect.
- The amount and type of fat in a diet can influence the level of serum cholesterol. The more saturated fat, the higher the level tends to rise; the less saturated or more polyunsaturated, the lower the level.
- The level of cholesterol is related to the development of coronary heart disease, although it cannot be demonstrated as a cause. The significance of a high serum cholesterol level becomes ominous when associated with other risk factors.
- There may be some truth in the "apple a day" adage since apples contain pectin which, in its natural form, helps to lower blood cholesterol.

Carbohydrates

- Chemists divide sugars and starches into two classes, complex and simple, on the basis of molecular structure. The simple ones are found in refined sugar, honey, milk, and fruits; the complex are found in flours, cereals, potatoes, legumes, and other vegetables.

- The simple sugars far outweigh the complex in an American's daily diet.

- Nutritionists believe that simple sugars are more likely to be turned into blood fat and/or body fat.

- Bread and potatoes do not deserve their reputations as fatty foods.

- Among the working classes of Japan who live on a high carbohydrate, low-fat diet with fish as their main protein source, coronary disease is virtually unknown.

- A low carbohydrate diet can threaten a dieter with serious energy depletion.

Heredity and Environment

- Parents often pass their diet habits on to children.

- The human race includes three general types of body structure:

    - Endomorph (tending to fat)

    - Ectomorph (tending to slimness)

    - Mesomorph (tending to muscularity)

- If a person has two thin parents, his chances of obesity are only 8 percent. With one obese parent, his chances rise to 40 percent. With two, he has an 80 percent chance of following in their footsteps.

- There is a familial tendency toward atherosclerosis, but diet can aid in offsetting this factor.

- Even rare cases of inherited faulty cholesterol metabolism can be aided by proper diet.

- Future genetic research may turn up knowledge to avoid high blood pressure, diabetes, high cholesterol in the blood, and atherosclerosis.

Calories

- A food calorie is a measure of energy - described as the amount of heat required to raise the temperature of 1 kilogram of water by 1 degree. If unused, this energy is stored in the human body as fat, with 1 pound of fat representing about 3500 calories.

- Diets in affluent societies tend to be high in total calories, high in animal and saturated fats, and "empty" calories from refined processed foods.

- Empty calories are those supplied by foods high in energy value but low in essential nutrients.

- Fifty calories in excess of need equals 1 pound in 70 days or 5 pounds a year.

- Alcohol adds empty calories to a diet and often complicates caloric control.

SUGGESTED APPROACHES

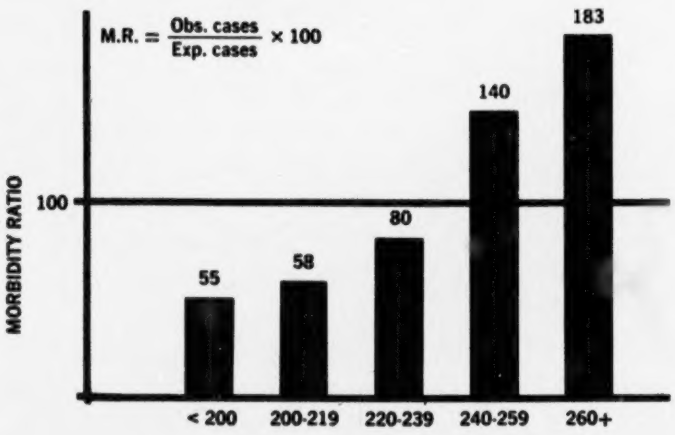
- Enlist the aid of State, county, and local medical personnel to provide lectures on the following topics.
  - Diet and Heart Disease
  - The Cholesterol Danger
  - Fad Diets

- Plan a panel discussion program involving a chemist, a nutritionist, and a doctor to discuss the total effects of malnutrition.

- Use the Framingham Heart Study charts as a basis for class discussion on serum cholesterol, blood pressure, ECG abnormalities, vital capacity, and cigarette smoking. These are taken from a pamphlet which is distributed by the U.S. Department of Health, Education, and Welfare.

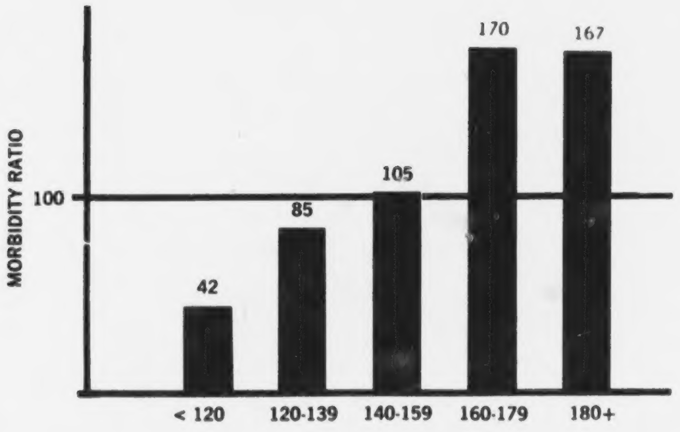
SERUM CHOLESTEROL

A man with serum cholesterol over 240 mg.% has more than 3 times the risk of a man with serum cholesterol less than 200 mg.%.



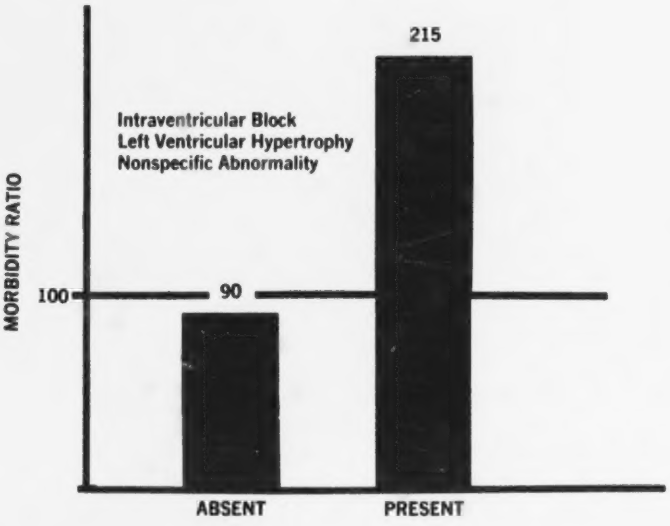
BLOOD PRESSURE

An individual with systolic blood pressure greater than 160 has 4 times the risk of an individual with SBP of less than 120.



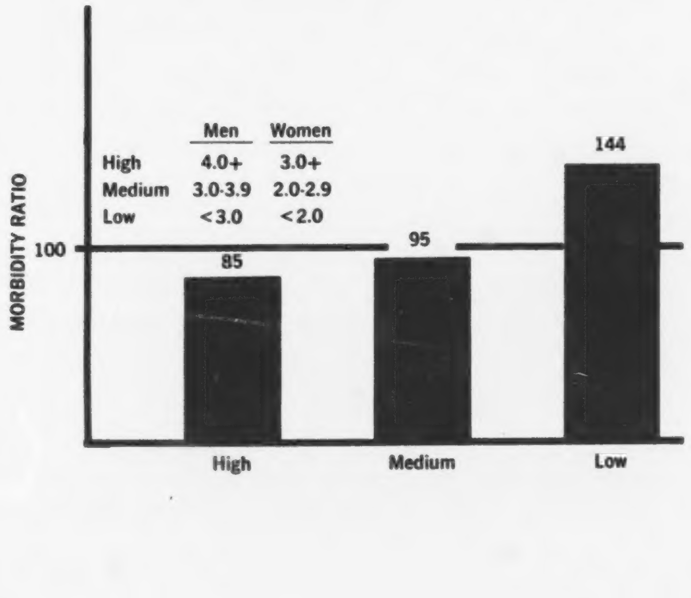
ECG ABNORMALITIES

An individual with an abnormality of the ECG has 2½ times the risk of one with normal ECG.



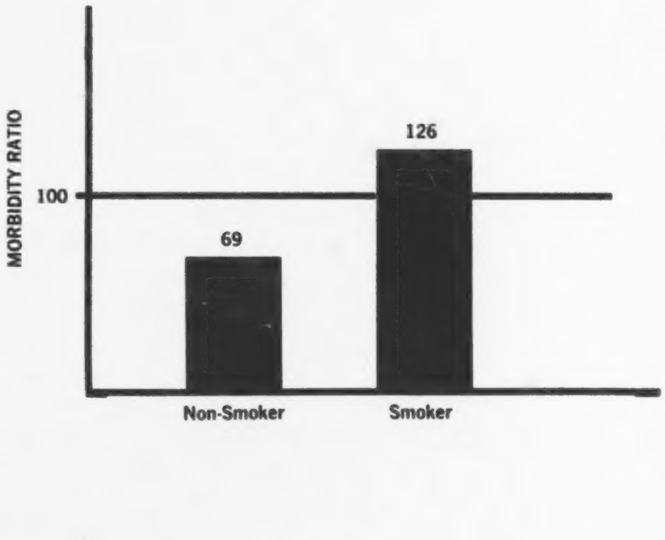
VITAL CAPACITY

Individuals with low vital capacity have approximately twice the risk of those with high vital capacity.



CIGARETTE SMOKING

A cigarette smoker has nearly twice the risk of the non-smoker.



- Distribute copies of a Weight-Watchers Diet and copies of the so-called Prudent Diet. Compare items and discuss the effects of each upon the cholesterol count.

- Provide the class with a list of books on modern diet and ask each student to make an assessment of the content and findings of a particular author.

- Mimeograph charts which show desirable weights for men and women and have the class evolve a self-assessment program.

- Have class members interview several insurance agents to check out company policy on insuring the overweight applicant.

- Using a chart which shows how activities utilize calories and a chart which indicates caloric count for specific foods, ask the class to set up a chart showing personal intake.

ANTICIPATED QUESTIONS

- Diet pamphlets often have conflicting suggestions for the same type of problem. How does a person know which one to accept as the best?

  A person can ask his physician, health officer, or health department nutritionist to recommend a diet. Nutritionists are located in Albany at the State Health Department offices, and at the six regional offices in Albany, White Plains, Buffalo, Rochester, New York City, and Syracuse.

- Dietary information is generally geared to the overweight and his problems. What health problems are faced by the underweight? Are there diets for him? Where does he get the information?

  The underweight person may be suffering from "borderline" nutritional deficiencies of vitamins or minerals. He may be unable to carry on sustained vigorous activity. He may feel "run down" and "tired" or nervous, or lack the energy to work or play. Underweight may also be a sign of a chronic disease such as diabetes, tuberculosis, or cancer. It is therefore important to understand the basic cause of the problem so that an appropriate remedy can be prescribed. The best way to determine causation is the physical examination which would include appropriate laboratory studies and a nutritional history. There are diets to improve appetite and correct underweight conditions. The information is best obtained from the sources mentioned in the answer to question one, the private physician, the health officer, and the nutritionist.

- Many young people are experimenting with drugs today. What degree of effect does each of the various drugs have on appetite and the desire for exercise?

  Amphetamines are used as weight reducing pills because they act as appetite depressants. Barbiturates are depressants and therefore an exercise deterrent. Hallucinogens represent a definite threat to one's general physical fitness.

- What are the usual causes of hypertension (high blood pressure) and what can be done to relieve this most common cardiovascular disease?

  Hypertension is caused by stress, kidney disease, or heart disease. Diet and familial tendencies also contribute to the basic causes of hypertension. All these causes, however, only explain about 20 percent of hypertension. The remaining 80 percent are due to unknown causes. The problem must be recognized by testing, explained by existing tests, and treated with the appropriate modality indicated by the tests. Drugs, exercise, and diet are very efficacious in the treatment of hypertension. Therefore, individuals should not hesitate to seek medical attention for this problem.

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834 Front St., Binghamton, N.Y. 13905.
812 Kenmore Ave., Buffalo, N.Y. 14216.
202 E. 44th St., New York, N.Y. 10017.
P.O. Box 1335, Poughkeepsie, N.Y. 12601.
249 Highland Ave., Rochester, N.Y. 14620.
101 E. Darlington Road, Syracuse, N.Y. 13208.

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New York State Department of Health. Facts about figures. 84 Holland Ave., Albany, N.Y. 12208. New York State Department of Health, O.P.H.E.

New York State Department of Health. Foods to eat...and why! (Posters are also available.) 84 Holland Ave., Albany, N.Y. 12208. New York State Department of Health, O.P.H.E.

Films

Eat to Your Heart's Content. Film Library, New York State Department of Health, 84 Holland Ave., Albany, N.Y. 12208 or local Heart Association office. (See Directory of Agencies.)

Facts about Figures. Film Library, New York State Department of Health, 84 Holland Ave., Albany, N.Y. 12208.

Song of Arthur. Film Library, New York State Department of Health, 84 Holland Ave., Albany, N.Y. 12208 or Metropolitan Life Insurance Company, 1 Madison Ave., New York, N.Y. 10001.

A prudent diet is recommended for all ages.

SMOKING AND HEART DISEASE

INTRODUCTION

Cigarette smoking has been recognized as America's number one public health problem. In New York State alone, approximately 16,000 deaths occur each year as the result of diseases related to cigarette smoking. The risk of death from coronary artery disease, the major killer of smokers and nonsmokers alike, is 70 percent greater for smokers.

The greater the number of cigarettes smoked daily, the higher the death rate. For men who smoke fewer than 10 cigarettes a day, the rate is 40 percent higher than for nonsmokers; for those who smoke 10-19 cigarettes a day, it is 70 percent higher; and for those who smoke 40 or more a day, the death rate is 120 percent higher.

Research has also shown that cigarette smokers are ill a great deal more often than are nonsmokers. Workers who smoke as much as a pack of cigarettes a day spend a third more time away from their jobs because of illness as people who have never smoked.

The great challenge to those working in the field of public health is to devise ways to reduce the number of new smokers and encourage smokers to stop smoking.

In order to reduce the number of new smokers, youth has to be reached. The widespread prevalence of cigarette smoking by grade school and high school students has continued to develop despite stringent laws in most states against giving or selling cigarettes to minors. The role of parents is self-evident, since numerous studies have shown that smoking is more common among children who come from homes where there is smoking.

For those who are smokers, approaches must be developed to motivate them to stop. Despite the abundance of evidence supporting the injurious and dangerous effects of cigarette smoking, 42 percent of the American population is still smoking.

There are a number of reasons why people continue to smoke. Some find kicking the habit fairly easy; others find it impossible. For those who have difficulty, health authorities stress the importance of cutting down on the number of cigarettes smoked per day. Speaking at the World Conference on Smoking and Health, Godfrey M. Hochbaum of the United States Public Health Service urged this approach:

> "Perhaps we should, in our appeals, not insist, as so many of us are inclined to do, that the only alternative to cancer and emphysema is total abstinence. Perhaps we should present complete abstinence as the single most desirable alternative...but allow that any substantial decrease in cigarette consumption is

better than nothing. It is very likely that thousands of smokers, who continue to smoke with both fear and a feeling of futility, may try to do at least something."

Acting on this advice, the United States Public Health Service has suggested five positive steps by which a smoker may avoid, at least in part, some of the harmful consequences of his smoking.

- Choose a cigarette with less tar and nicotine.
- Don't smoke the cigarette all the way down.
- Take fewer drags on each cigarette.
- Reduce inhaling.
- Smoke fewer cigarettes.

IMPORTANT CONCEPTS

- Nicotine increases the rate of heartbeat and prevents the heart from receiving sufficient rest between contractions.
- Blood pressure increases during and after smoking.
- Small blood vessels in the toes and fingers are constricted by the action of tobacco.
- Cigarette smokers have a substantially higher death rate from coronary artery disease than do nonsmokers. (See chart on page 27.)
- Smoking interferes with one's ability to enjoy an optimal level of physical fitness. In smokers, efficient utilization of oxygen in the body is greatly hampered by decreasing its diffusibility.
- Smoking decreases the amount of blood and oxygen available to muscles. Burger's disease, usually found in smokers, is an impaired circulation in the lower extremities which is complicated by smoking.
- Individuals can avoid premature deaths from coronary artery disease by avoiding the smoking habit, by reducing the amount they smoke, or by kicking the habit altogether.

RELATED FACTS

- *Diseases associated with cigarette smoking* In 1964, the Advisory Committee to the Surgeon General and the Public Health Service identified a number of disease categories associated with cigarette smoking. One category is diseases of the respiratory apparatus including cancers of the lip, larynx, bronchus, and lung, plus one nonmalignant condition, chronic bronchitis. A second category includes arterial sclerotic heart disease and noncoronary cardiovascular disease. The noncoronary category includes endocarditis, hypertensive heart disease, and certain residue rubrics of other heart and circulatory heart diseases.

- *Cardiovascular responses to smoking* The pharmacological action of nicotine may produce cardiovascular responses, although recent studies suggest that the carbon monoxide contained in tobacco smoke may also have the same effect. Nicotine increases cardiac work by increasing cardiac output in heart rate. Carbon monoxide interferes with the release of oxygen from the capillary blood, profusing the myocardium. While normal individuals generally compensate adequately by increasing coronary blood flow, cigarette smoke often produces significant myocardial ischemia in patients with coronary artery diseases.

- *Studies link smoking and heart diesease* Thomas R. Dauber, M.D., Framingham, and Joseph Doyle, M.D., Albany, reported their analysis of combined figures from the Framingham and Albany heart and smoking studies. These reports show a six-fold increase in fatal heart attacks and deaths from all causes among the middle age cigarette smokers compared with nonsmokers, former smokers, and pipe and cigar smokers of the same age. All of these 2,080 men, age 40-49, were free of clinical disease when observations began 8 years earlier in Framingham, and 6 years earlier in Albany. The differences were not attributable to differences in blood cholesterol levels, body weights, or blood pressures.

  Oscar Auerbach, M.D., and Cuyler Hammond, M.D., after looking at lung tissue under the microscope, suggest mechanism for the link between smoking and heart disease. Pathological studies found extensive rupturing and thickening of the walls of the air sacs or alveoli, in the lungs of smokers compared with those of nonsmokers. Small arteries and arterioles also were thickened worse in heavy smokers.

- *Other physiological effects of cigarette smoking* Cigarette smoking brings a small temporary increase in blood pressure and pulse rate plus a drop in skin temperature of the fingers and toes from the constriction of tiny blood vessels affected by the nicotine. Alfred Kershbaum, M.D., of Philadelphia General Hospital says that nicotine also stimulates the nervous system and the adrenal glands to release hormones which in turn release free fatty acids into the blood stream within 10 minutes after people smoke two cigarettes. The role of these free fatty acids in atherosclerosis is still unclear. Smoking does not seem to raise blood cholesterol levels, and it doesn't seem to have any significant effect on the blood flow through the coronary arteries of normal persons. But, in persons who already have coronary disease, electrocardiograms show that the blood flow has been reduced. Perhaps this is a direct result of nicotine intake. Other studies suggest that smoking speeds up the rate of blood clotting and makes the clots somewhat tougher; that heavy exercise puts a greater strain on the hearts and lungs of smokers than on nonsmokers; and that smoking impairs vital capacity, which has recently emerged as another coronary risk factor.

SUGGESTED APPROACH

Demonstrate the effect of smoking on the heart and circulatory system using the following two experiments.

Experiment one

- Have the patient light a cigarette, then take his pulse as he has concluded the third or fourth puff. When the cigarette is finished, take the pulse every 15 minutes until the pulse rate returns to normal. The arterial pulse, taken at the wrist, is an accurate indication of the heart rate. Once can take the pulse of a patient by placing two middle fingers of the right hand on the thumb side of the patient's wrist. The patient's pulse should be taken 2 or 3 times to establish a base line accuracy. In each instance record the pulse rate as the number of pulsations felt per minute.

- Chart your findings on a graph and determine how many extra beats one pack of cigarettes causes the patient. Since with each beat the heart pumps approximately 70 cc. of blood, calculate the extra volume of blood that is pumped by the heart induced by smoking one package of cigarettes.

Experiment two

- The slowing down of blood circulation can be tested with a clinical thermometer. Have the nonsmoker, or someone who has not smoked for several hours, hold the thermometer. Then have a smoker hold the thermometer. Smokers show a drop of about 6 degrees or more, even when using filter cigarettes.

ANTICIPATED QUESTIONS

- Does the number of cigarettes smoked per day have any affect on the death rate?

  Yes, the greater the number of cigarettes smoked daily, the higher the death rate. For men who smoke fewer than 10 cigarettes a day, the rate is 40 percent higher than for nonsmokers. For those who smoke 10-19 cigarettes a day, 70 percent higher, and for those who smoke 40 or more a day, 120 percent higher.

- What affect does cigar and pipe smoking have on health?

  Among men who smoke pipes or cigars, but no cigarettes, the incidence rate for first myocardial infarction falls between that for cigarette smokers and nonsmokers. Male pipe and cigar smokers experience an incidence of rapidly fatal myocardial infarctions (deaths within 48 hours) which is about the same as that of nonsmokers; in contrast, their excess risk for all other myocardial infarctions is very similar to that of the men who smoke cigarettes.

- If a woman is pregnant and smokes, what affect does it have on her health and that of her child?

  There is some evidence that among women who smoke during their pregnancy there are a greater number of "low birth rate" babies, that is, babies weighing less than the normal average. There may be other effects of smoking on the unborn baby which are not yet known. In relation to a pregnant woman's health, smokers have higher overall death rates than nonsmokers.

- What affect does cutting down on the number of cigarettes smoked have on the health of the smoker?

  If a smoker finds that he cannot stop altogether, it is advised that he choose a brand rated low in tar and nicotine, cut down on the number of cigarettes smoked, avoid inhaling deeply, and reduce the number of puffs taken.

- What are the benefits of quitting?

  Data from the American Cancer Society epidemiological study shows a consistent decline in death rates of men smokers in relation to the time that had elapsed since quitting. Those who had not smoked for 10 years or more, had death rates approaching those of nonsmokers.

- Is there a safe cigarette?

  The National Institute for Environmental Health Sciences located in Raleigh, North Carolina, has a budget of approximately $675,000 per year to do research in the development of a less hazardous cigarette. As yet, no safe cigarette has been manufactured.

- How effective are filters?

  While filters can be made that will remove almost every ingredient of the smoke, cigarettes of such filters would not be saleable. Charcoal filters reduce some of the gases that are harmful to the lungs, but the most commonly used filters only decrease some of the tar and nicotine.

- How can I stop smoking?

  Admit that it is not easy. However, approximately two million people in the United States each year are successful in breaking the habit. There is no set formula for breaking the habit, but the following can be recommended to the smoker:

  - *Find a motive or reason for stopping.*

  - *Be positive in your attitude about smoking - that is, recognize that you are giving yourself a gift. Consider the benefits of withdrawal: getting a habit under control, being rewarded by a renewed feeling of self-confidence, and reducing the risk of being stricken and crippled at mid-life by one of the chronic diseases associated with smoking.*

  - *Change your behavioral patterns. The smoker might analyze his smoking behavioral patterns by completing the Smoker's Self-Testing Kit which is available, free, from the New York State Department of Health. (See Bibliography.)*

- Does cigarette smoke have any affect on the nonsmoker who might be in the same room?

Recently, a study at Texas A & M University was done on a group of children, 103 boys and girls ages 6-13 years, divided into two groups. Group A, composed of 51 youngsters, was alternately exposed to 30-minute smoking and nonsmoking environment to determine any difference in heart rates. Group B, composed of 52 boys and girls, was exposed to a smoking environment only. Three blood samples were then taken to determine the effects on the amount of carbon monoxide in the blood. The study, directed by Carl W. Landis, M.D., and Donald J. Marki, M.D., offered these conclusions:

  - *Cigarette smoke, when allowed to accumulate in a poorly ventilated room, significantly increases the nonsmoking elementary-school-age child's heart rate, systolic-diastolic blood pressure, and the amount of carbon monoxide in the blood.*
  - *The smoking environment affects the nonsmoker in the same manner as it affects the smoker, but on a reduced scale.*
  - *Nonsmoking elementary-school-age children from nonsmoking homes react in much the same manner to a 30-minute exposure to a cigarette-smoking environment as do nonsmoking children of the same age from smoking homes.*
  - *Both sexes are affected similarly by a smoking atmosphere.*

- Has the cigarette consumption by the American public decreased or increased since the Surgeon General's Report?

A government sponsored survey shows that more American teenagers are smoking cigarettes, whereas the trend among adults is in the opposite direction. Over a one-year period, from 1968-1969, there was a 3 percent decline in the cigarette consumption of smokers 18 years of age and over. Daniel Horn, M.D., Director, National Clearinghouse for Smoking and Health, said that the figures suggest there are roughly a million more teenagers who smoke than would have been expected at the rates that prevailed two years ago when a similar study was done. The bulk of the increase is in the 14-18 year old age bracket.

SUGGESTED RESPONSES TO INDIVIDUALS GIVING REASONS WHY THEY CONTINUE TO SMOKE

Reason	It's relaxing. If I don't smoke, I will be a nervous wreck.
Suggested response	What's so relaxing in the smoke of a cigarette that contains 200 different irritating chemicals? Recommend that individuals do other things to relax like taking deep breaths, walking, stretching, drinking water.

Reason	I enjoy smoking.
Suggested response	What's so enjoyable about coughing, hoarness, shortness of breath, loss of taste, chest pains, loss of appetite, stomach pains, fatigue, insomnia? Think how pleasant it is to be free of the odor of stale cigarette smoke on hands, clothing, and in the room. Think about a mouth free of the taste of tobacco and fingers and teeth free of stains. Think of the satisfaction gained from conquering an undersirable habit.
Reason	I gain weight if I quit smoking.
Suggested response	This is true. Cigarettes may interfere with your appetite. That's because they affect the gastric juices and dull the tastebuds in your tongue so you don't enjoy food as much. If you gain too much weight, modify your diet. Instead of whole milk, drink skim milk. Eat fruits and raw vegetables and be moderate in the amount of food consumed. Do not substitute candy or chewing gum for the habit of smoking.

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Life and breath. New York State Health Department Film Library.

Smoking and heart disease. New York State Health Department Film Library.

The Mark Water's Story. New York State Health Department Film Library.

Exhibit

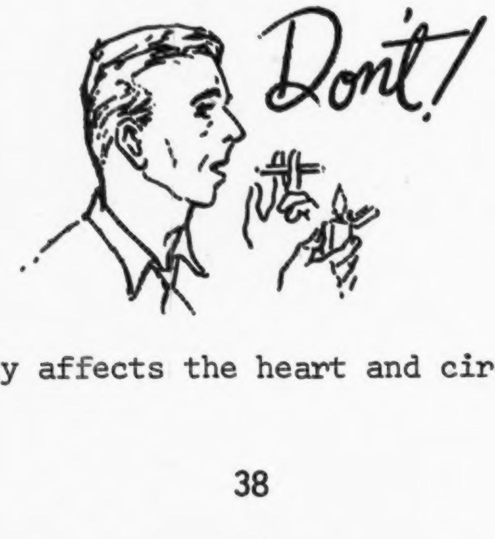
Human lung specimens (normal lung, cancerous lung, and emphysematous lung) may be obtained from the New York State Health Department, Office of Public Health Education, 84 Holland Avenue, Albany, New York 12208.

Note. Other films, pamphlets, and exhibits can be obtained from your local Heart Association, Tuberculosis and Respiratory Disease Association, and Cancer Society. If the local agencies cannot be contacted, write to:

American Cancer Society
New York State Division
1010 James Street
Syracuse, New York 13203

New York State Heart Assembly
3 West 29th Street
New York, New York 10001

New York State Tuberculosis and Respiratory
Disease Association
105 East 22nd Street
New York, New York 10010



Smoking adversely affects the heart and circulatory system.

STRESS AND HEART DISEASE

INTRODUCTION

Stress may be defined as a physical, chemical, or emotional factor that causes bodily or mental tension and may be a factor in disease causation. Even normal living causes wear and tear on the body. However, it is obviously impossible -- and undesirable -- to avoid all stress. Some kinds of stress actually add challenge and zest to living. The purpose of this discussion is to determine what kinds of stress may be harmful to individuals and to seek ways to avoid or minimize, these kinds of stress.

IMPORTANT CONCEPTS

- Stress is part of life. The infant struggling to sit up, the child attending the first day of school, the batter in a three-and-two situation, the young woman being interviewed for a job -- all are undergoing stress. It is hard to think of any physical or emotional activity that does not involve stress of some kind. This is an age of great stress, yet the primitive man facing a wild animal while armed only with a club or crude axe certainly faced as severe a stress as any that exists today. Clearly, man has always been exposed to great stress.

- Perhaps it should be realized that there are two basic forms of stress: one that is sudden, intense, acute; another that is low-level, repeated, chronic. In today's world, which is increasingly urban, overcrowded, fast-paced, and irritating, there is apparently more of this second kind of stress than there used to be in previous generations. While it may not be possible to avoid all sudden and intense stress situations, the thoughtful and analytical person should be able to reduce the hazards that are caused by chronic or continuing stress situations.

- Although we are using the word "stress" throughout this discussion, it is not actually the stress itself that is harmful, but the individual's physical or emotional reaction to it. Since it is evident that some persons seem to stand up well in situations that others find stressful, individuals should analyze themselves and their responses to different stimuli and should learn to recognize those events and situations in their daily lives that present some threat to them.

RELATED FACTS

- There is no reason to doubt that stress of various kinds has a cause-and-effect relationship to heart disease, even though the actual mechanism may not be scientifically spelled out in all its details.

Obesity, for instance, is one form of stress. It puts a strain on the heart and circulatory system in accordance with some of the basic laws of physics, in particular the laws of hydraulics. Obesity requires the heart to work harder to pump the blood through a longer than normal network of arteries and veins and capillaries.

- Cigarette smoking is a stress that affects the heart and blood vessels largely in accordance with the laws of chemistry, perhaps by the chemical action of nicotine and the other myriad constituents of cigarette smoke. There may be a physics strain process present here, too, when blood vessels constricted by the smoke ingredients force the heart to pump more rapidly and more forcefully to push the necessary quantity of blood through the narrower vessels. But we are concerned primarily in this discussion with mental and emotional forms of stress.

- *Can such forms of stress cause heart disease, specifically heart attack? The answer is affirmative, though it may be based somewhat more on empirical and clinical observation than on laboratory research findings.*

  Consider a few recent news reports:

  - In New York City, a 55-year old machinist seated at his ground floor living room window saw a car leap the curb and head straight for the window at high speed. The car veered off without striking the house, but the man had a fatal heart attack. Was this cause and effect or coincidence? Perhaps there is no clinical pathology to prove cause and effect, but the courts awarded his widow $266,000 in damages.

  - In Hollywood, a 60-year-old motion picture music director was informed by telephone that his wife had been killed when her station wagon plunged down a 150-foot embankment. He put the phone down, walked across the room, and died of a heart attack.

  - In London, a 4-year-old girl died within minutes after having four teeth extracted by a dentist. The coroner, a physician, said her heart stopped because of an excess of adrenalin in her blood; the excess, he said, had apparently been caused by her fear.

- Interestingly, even unborn children can be adversely affected by stress. In Warsaw, Poland, cannon shots were fired near a hospital during the celebration of a national holiday. Within the first half hour after the cannon blasts, the fetal heartbeat in 12 out of 15 patients rose to 170-180 and remained that high for several hours. For three women who faced complicated pregnancies, it was considered necessary to do Caesarean sections after the fetal pulse had risen to 220.

- As noted, the mechanisms within the body that go into action to bring about these effects following emotional stress are not completely understood in all details. But while it is probably true that fear or anger cannot suddenly clamp off a healthy heart artery, strong emotions can induce bodily reactions that can be harmful if there are existing underlying defects of the heart or circulatory system.

- In persons with severely narrowed coronary arteries, physical exertion can cause chest pain because the heart is made to pump harder, but the narrowed coronaries cannot supply it with enough oxygenated blood. Emotional excitement or anger also can cause chest pain by stepping up the blood pressure and the pulse rate, making the heart work harder. Emotional reactions can increase the coagulability of the blood, which may boost the chances of developing a blood clot and a coronary thrombosis.

- Stress situations, and emotional reactions to them, can jump blood cholesterol levels. Medical students taking final examinations have been found to have higher cholesterol levels than they have at other, less stressful periods. So have income tax accountants during their busy season. Exciting dreams have been shown to correspond with rise in blood cholesterol. One man developed a sharp rise in cholesterol when he learned that a woman he loved was going to marry someone else.

  There have been many such observations recorded, some measuring sudden rises in blood fats other than cholesterol. While it cannot be said flatly that such rises help bring on some heart attacks (because not enough is known about the effects on the arteries of such sudden brief increases in blood fats), it is at least clear that the mechanisms that govern the amounts of some fats in the blood are capable of reacting to impulses from the brain.

- Adrenalin (epinephrine) and noradrenalin (norepinephrine) are powerful substances secreted by the adrenal glands just above the kidneys. Generally, they increase blood pressure, stimulate the heart muscle, accelerate the heart rate, and increase the heart's output. These are the substances sent into the blood stream in larger than normal quantities when the brain receives signals that sudden physical danger, say, requires extraordinary physical and nervous effort to avoid or avert injury or death; the man who must literally run for his life to get out of the way of a speeding automobile has a better chance of surviving simply because his brain has signaled his glands to step up their output of chemicals that will allow his heart to work faster and harder. Adrenalin and noradrenaline serve other useful, less dramatic purposes under normal conditions; they help regulate blood flow in the body, and if the body is injured and in shock, they prevent blood pressure from falling dangerously low.

  But emotional stress (as in the small girl who feared having her teeth pulled) can also trigger the discharge of adrenaline and noradrenaline into the blood stream, stepping up the heart's activity and the blood pressure. Probably most normal healthy coronary arteries possess the ability to dilate and to carry more blood and oxygen into the heart whenever the increased activity causes the heart's demand for oxygen to rise. But if the coronary arteries have been hardened and narrowed by artherosclerosis, they lose the ability to dilate, oxygen deficit within the heart may occur, and the heart may suffer injury in proportion to the difference between the amount of oxygen it needs and the amount it gets.

- These are the bodily mechanisms known to go into action in situations of sudden, intense stress, but not much is known of the mechanisms that may be set in motion by long-range, lower-level stresses: anxiety, frustration, uncertainty, boredom, restlessness, deadline pressures, overwork, fatigue, lack of enough sleep, inability to relax, and other "wear and tear" factors that are part of modern living.

Nor is it known why two men doing the same job, even a menial one, can be affected quite differently by its stresses and tensions. One man may be contented with his work, the other unhappy and frustrated. Some observers have remarked that people who change jobs often, and who move their living quarters often, apparently have more heart attacks; others say that people who travel a great deal seem to be more susceptible. Working long hours has been associated by some with higher mortality from coronary disease. General practitioners of medicine are said to be more prone to coronary disease than specialists, and deaths from coronary disease are reported as more common among married persons than among those unmarried.

- At this point in time, the cause-and-effect mechanisms set in motion by chronic low-level stresses are not known. The whole subject of the role of emotional stress in heart attacks is still clouded and controversial, or at least debatable.

Yet there are two points that cannot be ignored:

- *The healthy heart can better withstand stress, emotional or otherwise, than the heart that has already begun to deteriorate.*
- *The thoughtful person can learn to avoid, or to accept calmly, those situations in his life that place undue stress on him.*

Other sessions of this course have discussed in considerable detail the lesson implicit in these two points: if a healthy heart can withstand stress well, obviously the sensible person will lead the kind of life that will not do unnecessary damage to his heart and that will actually improve and strengthen it.

- This means that, first he will not eat or drink too much, so that his heart will not have to labor needlessly against the burden of obesity. He will avoid foods high in saturated fats and cholesterol, while trying to maintain a balanced and nutritious food intake.
- Second, he will exercise regularly, consistently. "Hard work never hurt a healthy human heart," says Paul Dudley White, M.D. When a person works hard at some physical task, or exercises, or plays some fairly vigorous sport, his heart has to work harder and more efficiently in order to pump the oxygenated blood throughout the body and, by way of the coronary arteries, to itself. One result of this increased work for the heart is that it develops for its own use what is called collateral circulation; this is a healthy, flourishing, more extensive network of the blood vessels that supply blood to the heart itself. When an artery feeding blood to the heart becomes narrowed or even blocked by occlusion or by a clot, the heart seeks to grow new small blood vessels and capillaries that can bring oxygenated blood to the starved area of the heart. If a person's heart has already been regularly challenged by extra work -- tennis, swimming, brisk walking, cycling, or hard physical exertion of any

kind -- it will already have developed this kind of collateral circulation, at least in part. It is already prepared to face the emergency, whether that emergency is occasioned by physical stress or emotional stress.

Parenthetically, exercise and physical exertion can be of great help in relieving mental and emotional tensions, entirely apart from their physiological benefits. Everyone knows that a long, brisk walk can cool off a hot temper and that hitting a bucket of golf balls at a driving range can ease a man's frustration at some job or family situation that he can't solve but has to endure.

- Third, he will not smoke cigarettes. It has been shown that cigarette smokers develop coronary heart disease at a rate three to six times greater than those who do not smoke cigarettes. The Advisory Committee to the U.S. Surgeon General wrote that, "It is established that male cigarette smokers have a higher death rate from coronary artery disease than nonsmoking males."

- Learning to avoid, or to accept calmly, those situations that are stressful requires the individual to sit back and examine his own total life situation, so that he can determine which aspects of his daily routine are the threats to his peace of mind. Each man is different. For one, the cause of stress may be the neighbor's dog barking at dawn each day to set him seething and start the adrenalin flowing. For another, it may be his children's squabbling at the breakfast table. For a third, the aggravations and tensions of driving to work may create a stress situation.

In this last connection, it should be realized that driving in city traffic produces significant electrocardiographic changes in persons with coronary disease. Philadelphia investigators continuously recorded the electrocardiograms of 66 persons ages 38 to 72 during 2½ hours of driving under normal daytime conditions. In 11 of the subjects, changes occurred that were described as important, involving ischemic changes or arrhythmias that could be harmful to persons with coronary disease if repeated frequently.

For some persons, stress may result from some aspect of their work, perhaps differences of opinion with a superior or a colleague. For others, the problem will be something unsatisfactory or frustrating within the family relationship. For still others, the dangerous stress may be brought on by recurring situations related to church or country club or a trade association -- or doing the marketing or driving the children to school or putting up with a troublesome in-law or struggling with an undependable oven.

Whatever the areas of stress, the intelligent person who takes the time and trouble to analyze his, or her, life situation should be able to pinpoint them. And once the hazardous conditions have been recognized and identified, an intelligent person should be able to figure out methods of eliminating, minimizing, or by-passing them.

In general -- without dealing with specific problem areas -- it is good sense to adopt for oneself a daily regimen that:

Balances work with play Work industriously, but schedule time for relaxation. It need not be sport or physical recreation, though exercise is good, as noted earlier. But many a busy man has soothed his jangled nerves with music or a stamp collection or a woodworking bench in the basement - and many a harried mother has learned to relax through gardening or sewing.

Allows time for loafing If one is very active, a few minutes of slowing down and doing nothing can help ease the pressures of all the day's activity.

Provides enough sleep and rest Most adults need 7 hours sleep in every 24. Some need 8 or 9.

Lets one work off tensions Mostly, as indicated earlier, this will involve physical exercise or exertion. Emotional tensions can be greatly relieved by physical activity.

SUGGESTED APPROACHES

- Show the 15-minute film on emotional stress in everyday life, *Mr. Finley's feelings*, and engage in group discussion of its situations and message. This film may be borrowed from the State Health Department.

- Engage a mental health professional or paraprofessional person from a local mental health agency, psychiatric unit of a hospital, or other source, to speak on emotional stress and to lead group discussion.

- To encourage group participation, ask for individual suggestions of daily living situations likely to be stressful (such as driving a car in city traffic, being blocked in at a parking space, quarreling with wife or husband, having an argument with the boss at work, learning someone has told a scandalous lie about you), and list 10 or 12, or more if possible, on the blackboard. Have ideas of some other situations ready and if the group overlooks the basic ones, add them.

  Hand out index cards or paper and ask each student to list the three situations of those listed that cause the most stress in the student (in one-two-three order, perhaps). Tally the totals and write them on the board alongside the related situation. This may show there are some situations that many agree are stressful. But it may very well suggest that different individuals consider different situations to be full of stress. In either case, encourage the class members to talk about why they feel their own choices are more stressful to them and seek to get them to talk about ways by which they could avoid them, minimize them, or learn to live with them.

- If possible, encourage role-playing in which students act out some of the stressful situations they have listed.

ANTICIPATED QUESTIONS

- In what ways can stress be *helpful* to an individual? Usually the harmful effects are discussed.

  Stress seems to "tone-up" the preparedness of the body and organizes the body defense mechanisms against injury and infection. Physicians generally accent the harmful effects because their business is recognition and treatment of the harmful effects.

- Can cholesterol deposits in arteries be removed?

  Cholesterol blood levels can be lowered by diets and drugs but when deposited in the lining of blood vessels, they can only be removed by delicate operations, the results of which are not generally favorable.

- Will rigorous exercise offset a person's cholesterol intake?

  Rigorous exercise will help reduce an elevated blood cholesterol level but diet management is the best method and drug therapy is the next best method. By itself, exercise will not offset a high cholesterol intake.

- What types of exercises are best for reducing stress?

  Exercises that are "favored" by individuals produce better effects than exercises that the individual dislikes. In addition, the duration of the exercise should be sufficient to produce relaxation and fatigue of muscles used. Exercises should also be tailored to climate and existing facilities.

- Why does there seem to be more emotional stress in modern times than in previous generations?

  Relatively speaking, emotional stress is a more dominant form of stress today than in previous times. Emotional stresses existed in the past also, but there apparently were more outlets for offsetting physical activities. Walking, chopping wood, and farming used to require more effort and time and were part of the necessary activities of life. Today, elevators, automobiles, automatic heating systems, machines, and electronic technology have altered our physical acitivity patterns. In addition, we have become more aware of emotional and psychological problems through the sciences of psychology and psychiatry.

- What types of people are best able to cope with stress situations?

  This is a difficult question - all people can adapt to some stress situations, some with more ease than others. Most people will be poorly equipped to handle all stress situations or types of stress. The ability seems to be based on past experience, child rearing practices, exposure, and individual genetic makeup.

- Where can people who find difficulty in coping with their psychological (emotional) stresses find help?

  Help in coping with chronic psychological stresses can be found in the community clinical psychologist, psychiatrist, mental health worker, religious advisor, or family physician.

- Most emphasis in this unit is on the effects of stress upon the heart. What about the effects of stress upon the digestive system, the nervous system, the circulatory system, and the execretory system?

  To be sure, there is evidence that stress can attack all body systems. The example of ulcers is well known. Other manifestations of stress on the gastrointestinal system include indigestion, constipation and diarrhea. The nervous system is affected predominantly in some persons who develop tension headaches or hypertension. The skin can also manifest stress symptoms in the development of skin rashes or neurodermatitis. The emphasis on the cardiovascular system in this unit was intentional.

- Most heart problems are caused by *fear*. What can a person do to eliminate fear from his life?

  It would be impossible to prove that most heart problems are caused by fear. Some heart problems are undoubtedly caused by fear, but fear is such a basic emotional reaction that it is not wise to attempt to eliminate this reaction from our defense mechanisms. When a situation exists in which fear reactions are injurious, psychological and psychiatric assistance should be solicited. When the response is excessive, the individual should seek to gain insight into what he fears and why he fears it.

Emotional stress is a more dominant form of stress than in previous times.

PHYSICAL CONDITIONING TO PREVENT HEART DISEASE

It is suggested that the instructor study Topic 3, The Physiology of Heart Disease. This will provide him with the information necessary for conducting a safe and productive program in exercising.

MEDICAL EXAMINATION

Before the students report for their first class, they should have been examined by a physician and pronounced fit for exercise. Depending upon the school district's policy, the examination may be conducted by the adult's family physician or by the district's physician. The instructor or the director of the continuing education program should keep on file the certificate signed by the physician which indicates that the participant has been examined and approved for the program.

An examination form that describes specifically the type of exercises in which adults may participate is preferred. This ensures that an individual is not barred from the entire program because he cannot participate in all activities. An activities checklist such as the following might be used.

Most adults can benefit from participating in some phase of an adult fitness program even if they can't participate in each activity. Please check any of the activities that your patient, ________________, *should not be allowed to take part in.*

Swimming
Jogging
Calisthenics
Table Tennis
Volleyball
Skiing
Weight Training
Bicycling
Interval Training
Stunts and Tumbling
Softball
Ice Skating
Hiking
Circuit Training
Dancing
Basketball
Tennis
Apparatus Work

HOMEWORK

At the first session with the class, point out that physical fitness cannot be attained in two workouts a week and that each participant is expected to do his homework at least three times a week. To motivate adults to exercise, quote or summarize the following statement by J. Rosewell Gallagher, M.D., chairman of the AMA's Committee on Physical Fitness. This quote is taken from the April 15, 1965 *Physical Education Newsletter*, and is here reprinted by permission of the publishers, Croft Educational Services, Inc., New London, Connecticut.

> "The relationship of regular periods of physical activity to health is clearly established. The control of obesity and diabetes, the possible prevention, delay, or reduction of severity of heart disease and other degenerative processes, the rehabilitation of injured or damaged limbs and muscles, all of which may be considered present or future problems of youth, are related to adequate amounts of appropriate exercise. The Committee recognizes the preventive, as well as corrective, aspects of exercise and wishes to emphasize the former in regard to the maintenance of health.
>
> "Dynamic fitness or action capacity is developed and maintained through daily vigorous activity. To develop strength of muscle through the overload principle, endurance through increasing periods of exertion, and flexibility through repeating movements extending the range of motion, requires frequent and regular activity. Cardiovascular-respiratory function is enhanced by daily periods of exercise, such as running, which involve the large muscles, induce deep breathing, and place increased demands upon the circulatory system. The rate of recovery from physical exertion is improved and the likelihood of undue fatigue in daily living is reduced."

Mention the joint statement of the American Association for Health, Physical Education and Recreation (AAHPER) and the American Medical Association (AMA)--called Exercise and Fitness--which, among other things, points out that exercise:

- Helps prevent diabetes and atherosclerosis (a form of hardening of arteries).
- Plays a major role in weight control--retarding obesity which leads to organic degeneration.
- Combats the wasting away of muscle power.
- Helps prevent heart deterioration, circulatory inefficiency, joint stiffness, and the impairment of energy-converting functions of the body.

The report says: "In essence, the greatest contribution of exercise to fitness is improved organization of the body functions which support activity." Improved physiological efficiency is reflected in increased endurance, strength, and agility. The joint statement stresses the importance of continuous exercise--including games, sports, calisthenics, swimming, and dancing--all through life.

HOMEWORK ACTIVITIES

Suggest to the participants that they should establish a regular routine of jogging, interval training, rope jumping, bicycling, calisthenics, swimming (when possible), bench or chair stepping, ice skating, skiing, or walking.

Suggest to the participants that they might take a good brisk walk on their lunch hours. This will give them a mid-day exercise period of 15 to 30 minutes depending upon their individual working situations.

SUGGESTIONS FOR APARTMENT DWELLERS

To motivate apartment dwellers and those who might find an excuse to avoid exercising in inclement weather, suggest that they can easily do the following:

- Skip the elevator ride and walk the stairs. At first one may wish to ride the elevator part way and walk part way.
- Take a bathroom stool or chair and step up and down for several minutes. (Demonstrate bench stepping.)
- Undertake a 15-minute calisthenics routine (See the Glens Falls Routine under Related Materials)
- Jump rope (Demonstrate some simple routines for your class to use.)

SUGGESTED READING

You might also recommend that your students follow routines specified in the publications mentioned in the Bibliography.

Arrange to have these books available in the local public library, or purchase one or more of the books to distribute to class members as a guide to exercise. Distribute the Cureton low, middle, and high gear workouts, as well as other routines that might prove useful to the participants. (See Related Materials)

EXERCISE PRINCIPLES (See Cureton's Rules for Conducting Exercise under Related Materials)

In conducting workouts, follow these principles and suggest that your students follow them when exercising at home:

- Never start a workout fast or end it abruptly. Exercises must be given through progressive overloading. Put on the pressure and take it off. As endurance is increased, step up the pace.
- Warm up the group before moving to vigorous and strenuous exercises.
- Gradually increase the amount and strenuousness of exercise. Regulate the dosage as the group's physical condition improves.
- Assign nonstop activities that will develop endurance.
- Give students an opportunity to recuperate between exercises and groups of exercises.
- Assign plenty of deep-breathing exercises.

- Make the middle portion of the exercise the peak period. Work the group up to the peak slowly and gradually slow down the pace as the workout draws to a close.

- Plan your program to improve posture, flexibility, strength, balance, agility, and endurance.

- Recognize the emotional satisfaction that your class will derive from becoming physically fit.

MECHANICAL PRODUCTS

The students will probably inquire about some of the mechanical fitness products on the market. Advise them that they can achieve fitness by performing the routines taught in class--both in class and at home. However, don't discourage a person from buying equipment if he so desires.

CONDUCTING THE CLASS

Ideally, the class should meet four evenings a week for exercise periods ranging from 30 to 60 minutes. However, the most common schedule is for the class to meet for two periods of 2 hours for 3 semesters of 10 weeks. This would allow a grand total of 120 hours of instructional time in which to accomplish the objectives of combating heart disease and helping adults to lead longer and healthier lives through proper physical conditioning. (See the Organizational Chart on page vi.)

Methods of scheduling Obviously, most adults cannot exercise for 2 hours straight. It is therefore necessary to intersperse less strenuous activities. This can be accomplished by:

- Grouping the large class into sections and having them report at staggered times during the 2 hours for individual 30 or 40 minute exercise periods. This assumes that four periods of about 40 minutes a week have been scheduled.

- Conducting a 2 hour program utilizing a group of teaching stations and squad or activity leaders. This approach is preferable if it proved impossible to arrange for four evenings a week of conditioning activities. This scheduling will provide an opportunity to introduce games such as volleyball, softball, mat ball, and basket shooting, in addition to the more formal conditioning work.

- Two hours is a long time--and 30 sessions can seem like a great many to some adults, particularly if they're doing their homework several times a week. It will therefore be necessary to devise some motivating ideas to maintain group enthusiasm. Try: varied circuits, occasional folk and square dances for the last 40 minutes of the workout, and an early evening interval training jog and walk over neighborhood park trails.

- Warmup calisthenics, circuit training, jogging, and swimming are the activities that should be stressed in the physical conditioning classes.

Grouping Begin by grouping students on the basis of observations, physician's reports, and possibly test results on simple screening tests. After assigning class numbers to a group based on individual exercise tolerance, arrange the working area into four or five teaching areas. These might include a jogging area, a circuit training area, a game area, and an aquatics or swimming area.

Activity areas Start each period with the group assembled in a large area for warm-ups. Give much attention to bending, stretching, twisting, flexibility-type calisthenics and some easy running-in-place work to get the class ready for the workout in the various exercise stations.

A brief description of the routines that might take place at each of the major teaching areas follows.

ROUTINES

Nonstop, rhythmic activity Initially, the jogging station should be more of an interval training station in which the class will alternate walking briskly, jogging, skipping, and other movement activities. Intersersed with the movement activities should be such strength building calisthenics as push-ups (modified for women), sit-ups (modified for women), squat jumps, and squat thrusts.

Within this framework there will be participants at various levels of fitness. For some, the routine should be low gear; others will work at middle gear, and a select few may be able to go at top gear.

Thomas K. Cureton of the University of Illinois, first used these terms for continuous exercise with men and women in their 60's and 70's and he describes the levels as follows:

- *Low gear* The minimum objective is 30 minutes of continuous activity 4 days a week. The pace is slow with the emphasis on deep-breathing timed properly with the exercise. The initial daily routine should include a 1-mile walk--gradually increased to 2 miles. Following the walk, the low-gear exerciser should do push-ups, sit-ups, squat jumps, and leg raisings. After several weeks, he should run in place for a minute. Swimming should be included and the individual should work up to a point where he can swim continuously for 10 minutes. Individuals should stay in low gear for 2 to 3 months.

- *Middle gear* The minimum objective is 60 minutes of continuous exercise 5 days a week. The schedule should include one 2-hour workout. The middle-gear exerciser should begin his routine by walking 200 yards and then running 200 yards. He should repeat this pattern, alternating walking and running until he has covered a mile. He should then swim a lap in the pool, walk back, and swim another lap until he has completed 10 laps. If an exerciser does not have swimming facilities and cannot arrange to use them, he can run in place and do other exercises to develop endurance. Some exercises that serve the purpose include chinning the bar, combination sit-ups, and leg raising.

  A person should remain in middle gear for 6 months.

- *High gear* The minimum goal is three 2-hour workouts every week scheduled between days when the high-gear exerciser works out for 1 hour. Some typical high-gear routines follow:

  1. Run 200 yards. Walk 100 yards. Repeat 15 to 20 times. Run 350 yards at a vigorous pace. Finish with a warm and then a cold shower.

  2. Swim 100 yards. Walk a lap around the pool. Repeat 10 to 20 times. Then run 1 mile. Finish up with a warm and then a cold shower.

Sample continuous exercise routines

1. Walk 2 or 3 laps, deep breathing (forced), with arms swinging and as much body movement as possible. The walk should be brisk.

2. Skip one-half lap with arms swinging, knees bent, and forced deep-breathing.

3. Walk 1 lap following above procedures.

4. Repeat skipping one-half lap and walking 1 lap. Repeat two or three times. Increase skipping to 1 full lap.

5. Race walk or fast walk 1 lap. Walk at regular pace for 1 lap. Repeat two or three times.

6. Slow jog 1 lap. Walk 1 lap. Repeat twice.

7. Slow jog 2 laps. Walk 1 lap. Repeat three times.

8. Slow jog 3 laps. Walk 1 lap. Repeat twice.

9. Walk several laps to cool off. Continue arm swinging and deep breathing.

Once conditioned, the class may be able to reach the level of the following 30-minute nonstop routine devised by T. Cureton for physical education classes and adult fitness groups.

1. Alternate walking and jogging. (Four minutes.) Walk 3 laps, with arms moving briskly at sides. Breathe deeply. Jog 3 laps, running flat-footed. Repeat if time permits, increasing the pace slightly.

2. Alternate stretching and toe touching. (Three minutes.) Stand on toes and stretch hands over head five times. Then touch both hands to toes, keeping legs straight, 15 times. Repeat as long as time allows, increasing the pace slightly as you go.

3. Alternate walking and running. (Four minutes.) Walk 3 laps at a fairly brisk pace, pumping (flexing) and swinging arms and breathing deeply. Then run 3 laps "heel and toe" at medium speed. Alternate every third lap until time runs out.

4. Alternate push-ups and side-straddle hops. (Three minutes.) Do five push-ups (men from the toes, women from the knees), then 25 side-straddle hops with hands clasped overhead. Repeat if there is time.

5. Alternate walking, skipping, and running. (Four minutes.) The pace should be quick now. Walk 4 laps, skip 2 laps, and sprint 2 laps.

6. Alternate squat thrust and running in place. (Three minutes.) Do 10 squat thrusts; then run in place, knees high, for 1 minute. Repeat.

7. Walk briskly. (Two minutes.) Swing arms "windmill" style and breathe deeply.

8. Jog at a medium pace. (Two minutes.)

9. Alternate trunk bending exercises and animal walk on all fours. (Two minutes.) Do each 30 counts, then repeat.

10. Walk slowly. (One minute.)

11. Conclude routine. (Two minutes.) Hop on each foot for 30 seconds, then go into a slow zig-zag jog for 60 seconds. Finish by walking for 30 seconds breathing deeply.

Another challenging nonstop routine is the following 40-minute workout:

1. Walk 3 laps, moving arms and shoulders, and breathing deeply.

2. Jog 2 laps at a slow pace.

3. Walk 2 laps, moving arms and shoulders, and breathing deeply.

4. Jog 1 lap at a moderate pace.

5. Sprint 1 lap at three-quarter speed.

6. Walk 1 lap, moving arms and shoulders, and breathing deeply.

7. Facing the center of the circle, do 25 jumping jacks.

8. Facing the center of the circle, do 20 wing stretchers.

9. Facing the center of the circle, do 20 propellers (arm circles with palms up).

10. Jog 2 laps slowly.

11. Walk 1 lap, moving arms and shoulders, breathing deeply.

12. Facing the center of the circle, feet slightly apart, hands behind the head, do five body benders.

13. Facing the center of the circle, touch toes 10 times.

14. Facing the center of the circle, do 10 squat thrusts.

15. Jog 2 laps at a moderate pace.

16. Walk 1 lap, moving arms and shoulders and breathing deeply.

17. Facing the center of the circle, run in place with knees high for 30 seconds.

18. Starting from a sitting position, do 10 leg extensions.

19. Starting on the back, do five single knee raises on each leg; then do 10 double knee raises.

20. Starting on the back, do 10 leg lifts (spread legs and bring them together).

21. Working with a partner, do 10 knee bent sit-ups.

22. Jog 2 laps at a moderate pace.

23. Sprint 1 lap at three-quarter speed.

24. Walk 1 lap, moving arms and shoulders, breathing deeply.

25. On the back, facing the center, do the bicycle man for 10 counts.

26. From the prone position, do 10 push-ups (women-10 knee push-ups).

27. Jog 2 laps at a moderate speed.

28. Walk 1 lap, moving arms and shoulders, breathing deeply.

29. Facing the center of the circle do the following hop routine:
    20 on the left toes
    20 on the right toes
    25 up and down
    25 straddle
    25 stride

30. Jog 1 lap slowly.

31. Walk 1 lap, moving arms and shoulders, breathing deeply.

32. Jog 1 lap slowly.

33. Walk 4 laps moving arms and shoulders, breathing deeply.

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Keep the distinctions of low gear, middle gear, and high gear in mind as students join your program in succeeding years. This will help to challenge them and move them forward as their own exercise tolerance increases. Many physical educators have found exercising to music a helpful device when using continuous nonstop exercise routines.

Jogging For actual jogging, start slowly, use interval training techniques, and teach participants the proper techniques to be used in jogging. Set a realistic goal for most students by having them develop enough stamina to jog a mile in an exercise period interspersed with other exercises such as walking briskly, skipping, and the like. The more advanced students may be able to do still more.

The President's Council on Physical Fitness and Sports has devised a 16-week jogging routine, based on three workouts a week, that includes realistic goals and stresses interval training. A copy of the routine may be obtained by writing the Council.

Of particular help is the following pace chart that appears in the previously mentioned publication. To make the maximum use of the chart, measure the length of running paths and your indoor exercise areas and post them. Suggest that your students measure their own favorite jogging areas with an odometer.

WALK-JOG-RUN PACE CHART

	Time For Various Distances (min:sec)					
Pace	55 yds.	110 yds.	220 yds.	440 yds.	880 yds.	1 mile
Slow Walk	:38	1:15	2:30	5:00	10:00	20:00
Moderate Walk	:28	:56	1:52	3:45	7:30	15:00
Fast Walk	:25	:50	1:40	3:20	6:40	13:20
Slow Jog	:22	:45	1:30	3:00	6:00	12:00
Moderate Jog	:19	:38	1:15	2:30	5:00	10:00
Fast Jog	:17	:33	1:05	2:09	4:17	8:34
Slow Run	:15	:29	:57	1:54	3:47	7:34
Moderate Run	:13	:25	:50	1:40	3:20	6:40
Fast Run	:11	:22	:45	1:30	3:00	6:00

As the participants develop their cardiovascular fitness, you can gradually increase the amount of running and decrease the amount of walking and other activities at this station proportionally.

If you have a young group of adults in their 20's who have been working out on their own and are in good shape when they join your class or you work them into good condition, you might suggest such activities as a nonstop 15, 20, or 30-minute jog, steeplechase running in which they run up ladders, climb ropes, and jump hurdles.

Circuit training Devise challenging circuits to fit the needs of students at different stages of the fitness scale.

A relatively simple circuit involving five stations would include pull-ups, push-ups, sit-ups, jumping jacks, and squat thrusts. The adults might be asked to do a certain number of repetitions at each station and then jog to the next station at the signal. Bench stepping and rope jumping might be added to this circuit through which the group runs two or three times.

Another circuit involving the use of weights and some apparatus includes the following stations: wrist curls, barbells, push-ups, jump rope, sit-ups, weight lifting, pegboard climbs, vertical jumps, rope climbing, hanging on the isometric bar, parallel bar dips, and pull-ups on the high bar.

A 12-station circuit recommended by the President's Council on Physical Fitness and Sports includes the following: bench step, upright rowing, windmill and jog, two-hand curl, sprinter, sit-ups and jog, pull-ups or bent-arm hang, squat thrust, side-straddle hop and jog, standing press, trunk twister, and bar dips and jog.

The circuits can be modified to fit the abilities of various groups by increasing the number of repetitions at each station, increasing the weight to be lifted, and decreasing the time permitted to perform each task at each station.

In circuit training as well as other activities, modifications can be made for women. For example, balancing and flexibility activities could be increased and weight lifting assignments reduced.

To make sure that each participant knows exactly what he or she is to do at each station, a card listing the task, the number of repetitions, and the time permitted should be prepared. The card remains at the station for the participants to read as they rotate to the various stations.

Games In this area, the emphasis is not so much on formal conditioning as it is on stressing that the class should get in condition to play games rather than playing games to get in shape. The games played--indoors or out--will depend upon the individual facilities, equipment, and to some extent the age, size, and condition of the class. Some games that might prove popular are volleyball, cageball, mat ball, indoor baseball, crab soccer, variety ball, shooting baskets, half court basketball, whiffle ball, table tennis, softball, and tennis. Folk or square dancing should occasionally be included in the game period.

Swimming The swimming program should generally be a free period following the exercise-game activities. The object is to have the group unwind, relax, and still get the benefits of swimming for fitness. Encourage such activities as swimming a few laps. Teach class members a variety of bobs. Work out some coeducational synchronized swimming routines for the better swimmers.

Nonstop swimming routine There are swimming routines that can be followed using the continuous rhythmic exercise principle. Below is a 50-minute, low-gear, nonstop, aquatics routine.

The routine is designed for a pool that is 75 feet long. Before the actual aquatics routine is started, have your class warmup by performing some light rhythmical exercises involving stretching, bending, and deep breathing.

1. Glide. Kick across the pool.
2. Glide. Using only the arms, move across the pool.
3. Crawl stroke. Swim across the pool and return.
4. Flutter kick. Assume the prone position, then kick across the pool and back.
5. Crawl stroke. Swim across the pool and back.
6. Flutter kick. Lying on the back, kick across the pool and back.
7. Tread water. Using only the legs, tread water for 2 minutes.
8. Bobbing. Bob for 3 minutes.
9. Breaststroke. Using the breaststroke, swim the length of the pool and loaf back. Repeat twice.
10. Crawl stroke. Using the crawl stroke, swim the length of the pool and back.
11. Backstroke. Using the backstroke, swim the length of the pool and loaf back.
12. Crawl stroke and breaststroke. Use the crawl stroke down the pool and the breaststroke back. Repeat three times.
13. Backstroke and breaststroke. Use the backstroke down the pool and the breaststroke back. Repeat three times.
14. Crawl stroke and walk. Crawl stroke down the pool, get out of the pool and walk back. Repeat 10 times.
15. High bobbing. High bob for 30 seconds.
16. Over and under. Do the over and under routine for 60 seconds.

17. Bobbing. Bob for 60 seconds.

18. Exhale and walk on bottom of pool. Surface and breathe. Repeat this process for 2 minutes.

19. Drownproofing. Practice drownproofing techniques for 5 minutes.

Note that the routine contains a substantial amount of bobbing which provides a well-rounded workout involving leg power, arm and shoulder work, heavy forced breathing, and vigorous rhythmical action. Interval training is also used (items 9-14), with participants alternating swimming and walking laps or changing strokes using a specific pattern.

Other routines are available from the President's Council on Physical Fitness and Sports. The above routine can be modified to provide variety and meet the individual needs of a particular class.

SPECIAL ACTIVITIES

To keep interest high, change routines often and provide a variety of activities within the framework of the principal objective--preventing heart disease among adults.

Chair routine This workout can be used once or twice each 10-week semester. It will keep the group on its toes both mentally and physically and at the same time give them some ideas for adding new dimensions to their homework activities.

Set up the exercise area with sturdy chairs in several rows. Make sure that you have sufficient distance between individual chairs and between the rows to allow room for running, walking, skipping, and the other movements described below:

1. Sit down and stand up. Have the class warmup by sitting down and standing up alternately to the commands up, down, up, down.

2. Around the chair. Have each participant run around his chair in a clockwise direction several times. Repeat the exercise with the participants moving in a counter-clockwise direction. Do not overdo as some participants may get dizzy.

3. Around the row. Have the class run around their own row of chairs moving to the right, several times. Then repeat, moving to the left.

4. Lift up chairs. Change the pace by having the class members stand behind their chairs and lift them in various ways. Control the pace and length of this aspect of the routine.

5. Around all the rows. Have the class members run to the front of their individual rows. At the signal, the people in the right-most row proceed to run around the outside rows of chairs, circling to the right. As the last person in the row begins to run, the adult in the next row falls in and runs to the right. The class can be asked to make

one complete lap or more around the rows and take their seats. Participants waiting to begin the run, can be asked to run in place. This activity can be varied by having the group run around the rows the first time, skip the second, gallop the third, and walk the fourth.

6. Zig-zag in and out around the row. Have the people in each row move to the front of their rows. Then have them run in and out lengthwise to the right around their own row of chairs. When each individual reaches the back of the row, he runs straight to the front. When everyone is in front, repeat the process again.

7. Move up one, move up two. Ask the class to pay particular attention to your commands. On the command "Go" each person runs from his chair to that of the person in front of him--except for the person in the front seat in each row, who runs back and takes the last seat in the row. Repeat this command several times, until the individuals in each row are in their own seats. Then use the same procedure having the participants move up two and even three seats--with the first two or three people in the row taking the last two or three seats. Vary the routine by alternating commands so that the class has to listen particularly closely to know the assignment or by giving commands so that the group can actually sit down once they reach the chairs or make it so rapid that there is no time for the group to stop.

8. Step on and off chairs. This is a variation of the Harvard Step Test or Bench Stepping. Set the pace as the class members move on and off the chairs to the commands up, up, down, down.

9. Push-ups and sit-ups. This is a calisthenic break that the group can take. Each student does the stipulated number of repetitions. For variety, assign jumping jacks, squat thrusts, and similar activities instead of push-ups and sit-ups.

10. Follow the leader. Have the class follow you in and around the rows. No oral commands are given. Run, skip, hop, walk, jog, gallop, etc. Let individual class members take over as leaders.

When the routine is finished, let the class walk around the room several times slowly, breathing deeply in and out. This will enable the group to ease slowly out of the exercise routine. At various intervals in the workout, you might allow time for deep breathing as the group recuperates after a vigorous run.

A second special activity that may be included are so-called relaxation exercises. They are designed to help relieve tensions--a major cause of cardiac problems. If interested, write to the Division of Physical Education and Recreation, State Department of Education for information.

Lecture Hardly a special activity, but one that should be included, is an occasional lecture by a prominent local physician on the value of exercise to adult health. The doctor should have a diagram of the body on a board and proceed to tell the class in simple terms just what happens to the various organs and muscles when they are exercised properly. He should explain such terms as calories, overload, and exercise tolerance. The purpose of this is to stimulate further participation by the group, give them some information as to why they are participating in the program, and reinforce their belief in exercising to avoid heart difficulties.

The physician's visit might be a good time to teach the class how to take their own pulse after vigorous exercise, such as 4 minutes of bench stepping. The physician should take a sample case or two and comment on the particular individual's recuperative powers and state of fitness as revealed by the pulse count.

OUTDOOR PROGRAMING

In the late spring and summer:

- Use the track for jogging and interval training.
- Use outdoor pools for swimming.
- Use tennis courts on the school grounds.
- Take a 2-hour hike at a brisk pace through park paths or over outdoor education nature trails.
- Schedule a bike hike for 2 hours over park paths.
- Let your adult education class go through the outdoor obstacle or challenge course.

The activities and routines described earlier in this chapter can all be performed outdoors with little or no modification. There are many advantages to this. The most obvious is that the community at large will see the class exercising. Citizens will realize that this is a good, healthy, and beneficial expenditure of time. Hopefully, they will see that physical activity of a vigorous nature is acceptable, beneficial, and important for all adults. Outdoor activities, with increased public visibility, may inspire other adults to join the program next semester or next year. (See Cureton's "Outdoor Summer Workout" under Related Materials.)

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Films

Exercise and Health. Coronet Films. 65 E. South Water St. Coronet Building, Chicago, Illinois. 60601.

Fitness Challenge. The President's Council on Physical Fitness and Sports, Washington, D.C. 20201.

Why Exercise? Associated Film Service. 3419 W. Magnolia Blvd. Burbank, California. 91505.

RELATED MATERIALS

CURETON'S BASIC PRINCIPLES OF PHYSICAL FITNESS WORK
(RULES FOR CONDUCTING EXERCISE)

Warmup rule Take it easy for 15 to 20 minutes. Walk before you run. At least do some preliminary bending, stretching, and running in place. A warmup is protection against injuries and the sudden development of an oxygen deficiency.

Regulation of dosage Build up the intensity of the work gradually; then push up to a peak of effort; then taper off. Several ways to regulate the work are to walk a lap and jog a lap; repeat several times. Then walk several laps. Walk a lap and jog 2; walk a lap and jog 3; walk a lap and jog 4; etc. Then walk several laps. Take a long jog-continuous slow running. Do repetitious fast runs with walks between. Cross-country run, walk, and jog.

Rule for progressively more work Improvement depends upon a gradual increase in the total amount of work done. The progression is equivalent to 100, 300, 500 calories of heat, corresponding to 30 minutes, 45 minutes, and an hour of work with a gradual increase in intensity.

Recuperation rule Keep moving, don't sit down; go from the gym to the showers (hot, then cold) and swim a few minutes if possible. Breathe as deeply as possible and force the breath out explosively. Stretch any muscles which have been worked hard. Avoid smoking, which constricts lung capillaries.

Working various parts Exercise the neck, shoulders, chest, upper back, waist, lower back, abdomen, legs, and feet. In addition, there should be some running (perhaps in place) or rowing, skating, swimming, cycling, skiing -- some continuous rhythmical work for endurance, forcing the circulation and respiration.

Rules for heart protection Warmup gradually before exposure to hard work, or extreme cold or extreme heat; avoid severe tensions longer than a few seconds at a time; and try to get enough ventilation for the work being done. Adhere to any limitations recommended by your physician.

Rule for deep breathing Time breathing with each exercise so as to get as full and deep ventilation as possible. This wards off fatigue.

Use of fuel To use up the fuel (food) it is a matter of 1 to 15 calories burned per minute, depending upon the intensity of the exercise. The length of time one exercises at a given rate determines how much fuel is used. To burn 1 pound of fat requires 4320 to 4380 calories, according to the respiratory efficiency. To burn fat reserves takes time. There is no short cut.

Posture rule Posture should be relaxed enough to permit good circulation. Strength is needed for the posture maintaining muscles to resist gravity for any length of time. Posture muscles should be trained. These are the muscles of the neck, shoulders, abdomen, seat, thighs, and supinators of the foot.

OUTDOOR RUNNING WORKOUT

	Easy	*Moderate*	*Hard*
1.	Warmup by bending, stretching, deep-breathing, push-ups, leg-lifts, high-kicks, lateral cross-over ground touching, and squat-spring bending exercises.	Warmup, by bending, stretching, deep breathing, push-ups, leg-lift, high-kicks, lateral cross-over ground touching, and squat-spring bending exercises.	Warmup by bending, stretching, deep-breathing, push-ups, leg-lifts, high-kicks, lateral cross-over ground touching, and squat-spring bending exercises.
2.	Jog, ¼ mile. Stop to repeat squat-spring bending and deep breathing, hip stretching, and muscle kneading.	Jog, ½ mile. Stop to repeat squat-spring bending and deep breathing, hip stretching, and muscle kneading.	Jog, 1 mile. Stop to repeat squat-spring bending and deep breathing, hip stretching, and muscle kneading.
3.	Sprint pick-ups, 50 yards. Walk and deep breathe.	Sprint pick-ups, 100-200 yards. Walk and deep breathe.	Sprint pick-ups, ¼ mile. Walk and deep breathe.
4.	Jog, ½ mile.	Jog, 1 mile.	Jog, 2 miles.

	Easy	*Moderate*	*Hard*
5.	Walk, deep breathe, and stretch for recuperation.	Walk, deep breathe, and stretch for recuperation.	Walk, deep breathe, and stretch for recuperation.
6.	Shower or swim.	Shower or swim	Shower or swim.

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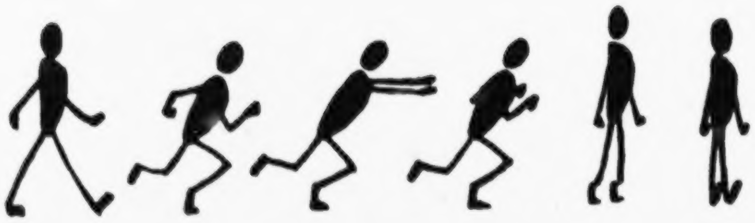
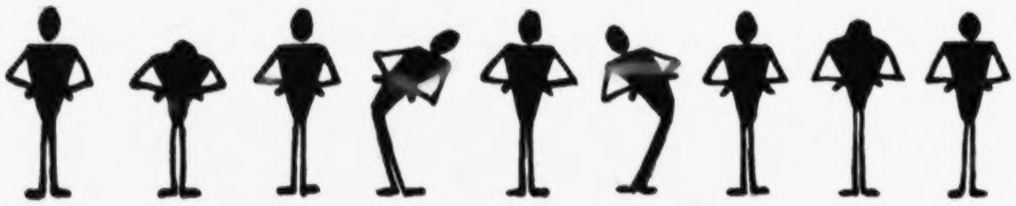
Take advantage of everyday opportunities to stay in shape.

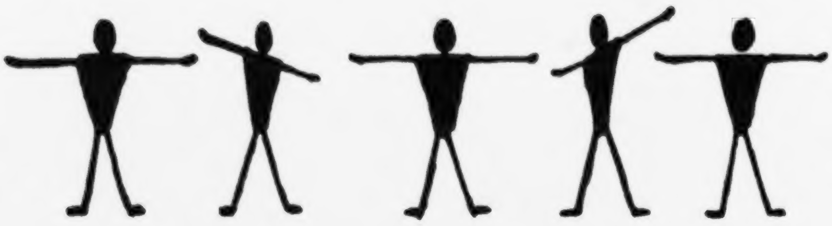
GLENS FALLS ROUTINE



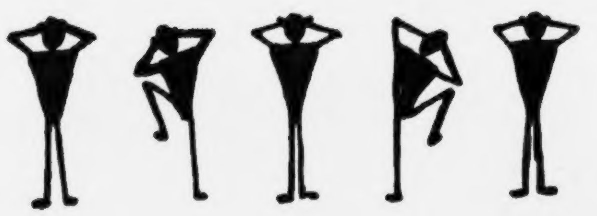
Brisk walking, easy jogging, arm pumping, walking on heels and toes. Two or 3 minutes as warmup.



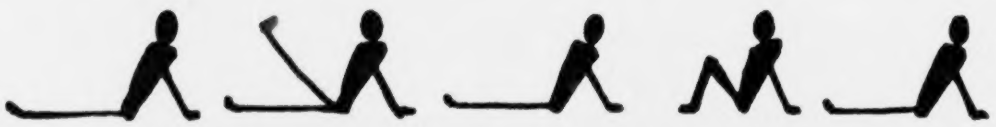
Trunk bends, forward 16 times; left side, right side 16 times.



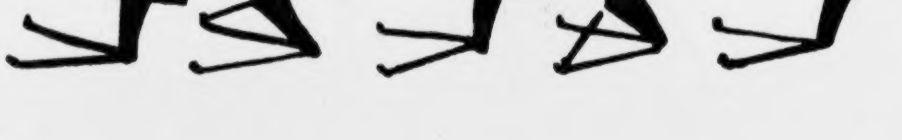
Trunk twisting left to right 16 times.



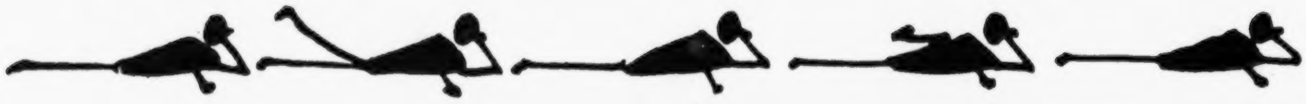
Lift knees vigorously -- alternate left and right 24 times. With hands clasped behind head, bring elbows to knees; alternate left and right 20 times.



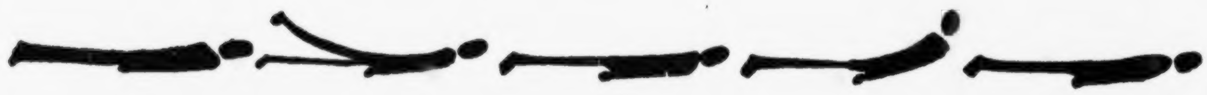
Single leg raises left and right 24 times, both knees to chest 30 times.



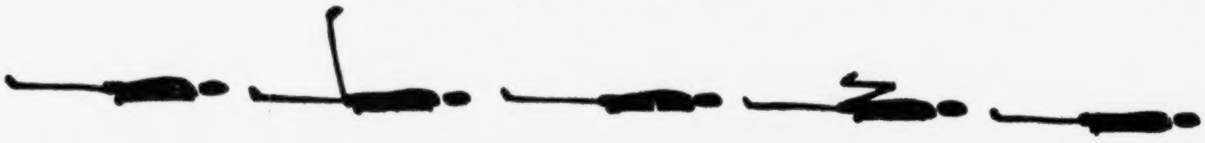
Touch left toes with right hand and right with left 20 times.



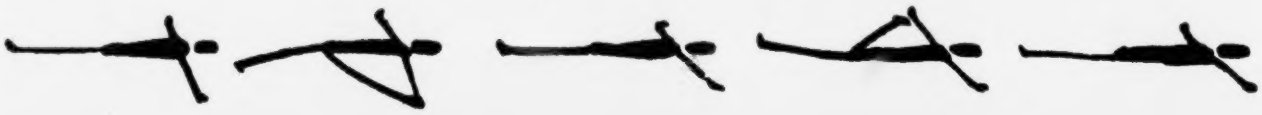
Lying on left side, raise top leg 16 times, bring knees to chest 16 times. Repeat on right side.



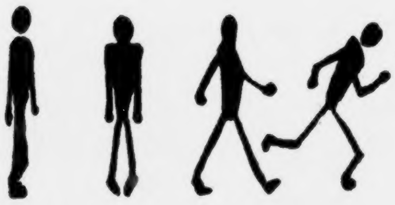
Lying on stomach, hands beside hips, palms down; raise left leg 8 times; repeat with right leg, then arch from waist upward 8 times.



Lying on back, raise left leg to point at ceiling 8 times. Repeat with right leg, then bring left leg to chest 8 times; repeat with right leg.



Lying on back, arms shoulder level, bring left toe into right palm 8 times. Repeat with right toe into left palm.



FINISH -- up on toes, 8 times; drop on to ankles 8 times; jog or walk briskly 30 to 50 steps.

DIRECTORY OF AGENCIES INTERESTED IN HEART DISEASE PREVENTION

NATIONAL AGENCIES

Advisory Committee to the Surgeon General, c/o U.S. Public Health Service, 330 Independence Ave., S. W., Washington, D. C., 20201. 202-963-1110

Alcoholics Anonymous, Grand Central Station, P. O. Box 459, New York, New York, 10017. 212-GR3-6200

American Cancer Society, 219 E. 42nd St., New York, New York, 10017. 212-759-3500

American Heart Association, 44 E. 23rd St., New York, New York, 10001. 212-477-9170

American Medical Association, 535 N. Dearborn St., Chicago, Illinois, 60610. 312-527-1500

American Public Health Association, 1740 Broadway, New York, New York, 10019. 212-CI5-8000

Metropolitan Life Insurance Co., 1 Madison Ave., New York, New York, 10001. 212-578-2211

National Clearing House for Smoking and Health, 5600 Fishers Lane, Rockville, Maryland, 20852. 301-443-1374

National Dairy Council, 111 N. Canal St., Chicago, Illinois, 60606. 312-FR2-3156

National Heart Institute, National Institute for Health, Bethesda, Maryland, 20014. 301-656-4000

National Interagency Council on Smoking and Health, Suite 1301, 419 Park Ave., New York, New York, 10001. 212-532-6035

National Research Council, Division of Medical Sciences, 2101 Constitution Ave., N.W., Washington, D.C., 20418. 202-393-8100

Nutrition Foundation, Inc., 99 Park Ave., New York, New York 10016. 212-MU7-4830

U.S. Public Health Service, 330 Independence Ave., S.W., Washington, D.C., 20201. 202-963-1110

STATE AGENCIES

New York State Department of Health, Division of Preventive Services,
885 Central Ave., Albany, New York, 12206. 518-457-7324

New York State Heart Assembly, Inc., 3 West 29th St., New York, New York,
10001. 914-MU6-3860

REGIONAL HEALTH OFFICES

Albany Regional Office, The State Campus, Building #9, Albany, New York,
12226. 518-457-5150

Buffalo Regional Office, 584 Delaware Ave., Buffalo, New York, 14202.
716-842-4336

New York City Regional Office, 270 Madison Ave., New York, New York 10016.
212-689-9070

Rochester Regional Office, 1122 Commerce Building, 119 E. Main St.,
Rochester, New York, 14604. 716-546-6556

Syracuse Regional Office, Room 245, State Office Building, 333 E. Washington
St., Syracuse, New York, 13202. 315-GR4-5951

White Plains Regional Office, 99 Church St., White Plains, New York, 10601.
914-WH9-6314

REGIONAL MEDICAL PROGRAMS

Nassau-Suffolk Regional Medical Program, Inc., 1919 Middle Country Road,
Centereach, New York, 11720. 516-585-7800

New York Metropolitan Regional Medical Program, 2 E. 103rd St., New York,
New York, 10022. 212-427-4100

Regional Medical Program for Western New York, State University of New York,
School of Medicine, 2211 Main St., Buffalo, New York, 14214. 716-835-0728

Regional Medical Program of Central New York, Upstate Medical Center,
750 E. Adams St., Syracuse, New York, 13210. 315-473-5600

Regional Medical Program of Northeastern New York, Albany Medical College,
47 New Scotland Ave., Albany, New York, 12208. 518-462-7521

Rochester Regional Medical Program, University of Rochester, School of
Medicine and Dentistry, 260 Crittenden Blvd., Rochester, New York, 14620.
716-275-4540

COUNTY HEALTH DEPARTMENTS

Albany County Health Department, S. Ferry and Green Sts., Albany,New York,
12201. 518-436-8481

Broome County Health Department, 68 Water St., Binghamton, New York, 13901. 607-772-2101

Cattaraugus County Health Department, 302 Laurens St., Olean, New York, 14760. 716-FR2-3181

Cayuga County Health Department, Box 219, 5 James St., Auburn, New York, 13021. 315-253-9731

Chautauqua County Health Department, County Court House Annex, Mayville, New York, 14757. 716-753-2145

Chemung County Health Department, 311 Baldwin St., P.O. Box 266, Elmira, New York, 14901. 607-RE3-4625

Clinton County Health Department, P.O. Box 846, Plattsburgh, New York, 12901. 518-563-1500

Columbia County Health Department, 363 Allen St., Hudson, New York, 12534. 518-TA8-3358

Cortland County Health Department, City Hall, 25 Court St., Cortland, New York, 13045. 607-SK-6-9931

Dutchess County Health Department, County Office Building, 22 Market St., Poughkeepsie, New York, 12601. 914-485-9800

Erie County Health Department, 601 City Hall, Buffalo, New York, 14202. 716-846-7796

Genesee County Health Department, 3836 W. Main Road, Batavia, New York, 14020. 716-546-4770

Monroe County Health Department, Health and Social Services Building, 11 Westfall Road, Rochester, New York, 14602. 716-442-4000

Nassau County Health Department, 240 Old Country Road, Mineola, New York, 11501. 516-PI2-3000

Niagara County Health Department, 525 Bewley Building, Main and Market St., Lockport, New York, 14094. 716-HF4-2835

Onondaga County Health Department, 300 S. Geddes St., Syracuse, New York, 13204. 315-477-7351

Orleans County Health Department, Albion Medical Building, 245 S. Main St., Albion, New York, 14411. 716-589-5621

Putnam County Health Department, Putnam County Office Building, Gleneida Ave., Carmel, New York, 10512. 914-CA5-3641

Rensselaer County Health Department, Health Building, 7th and State Sts., Troy, New York, 12180. 518-AS2-2300

Rockland County Health Department, 50 Samsondale Plaza, W. Haverstraw, New York, 10993. 914-947-1500

Schoharie County Health Department, Schoharie, New York, 12157. 518-AX5-7265

Seneca County Health Department, Taylor-Brown Memorial Hospital, Waterloo, New York, 13165. 315-539-9267

Suffolk County Health Department, Suffolk County Center, Riverhead, Long Island, 11901. 516-PA7-4700

Tompkins County Health Department, "H" Building, 1287 Trumansburg Road, Ithaca, New York, 14850. 607-AR3-7272

Ulster County Health Department, County Office Building, 244 Fair St., Kingston, New York, 12401. 914-WH9-1300

Westchester County Health Department, County Office Building, 148 Martine Ave., White Plains, New York, 10601. 914-WH9-1300

Wyoming County Health Department, Wyoming County Community Hospital, 400 N. Main St., Warsaw, New York, 14569. 716-796-3165

LOCAL HEART ASSOCIATIONS

Broome County Heart Chapter, 134 Main St., Binghamton, New York, 13905. 607-723-0208

Central New York Heart Association, 1024 Park Ave., Utica, New York, 13502. 315-724-2137

Dutchess County Heart Chapter, 51 Cannon St., Poughkeepsie, New York, 12601. 914-454-4310

Finger Lakes Heart Chapter, 120 N. Main St., P.O. Box 105, Canandaigua, New York, 14424. 315-394-1240
serves Livingston, Ontario, Seneca, Wayne, Yates

Genessee Valley Heart Association, 217-A Alexander St., Rochester, New York, 14607. 716-232-2820
serves Monroe and Orleans

Heart Association of Eastern New York, 257 Osborne Road, Loudonville, New York, 12211. 518-869-9266
serves Albany, Clinton, Essex, Fulton, Montgomery, Rensselaer, Saratoga, Schenectady, Schoharie, Warren, Washington

Heart Association of Southwestern New York, 312 Hotel Jamestown Building, Jamestown, New York, 14701. 716-483-1509
serves Allegheny, Cattaraugus, Chautauqua

Heart Association of Upstate New York, 612 Midtown Plaza, Syracuse, New York, 13210. 315-476-5381
serves Cayuga, Cortland, Onondaga

Heart Association of Western New York, Hotel Statler Hilton, Suite 55,
Buffalo, New York, 14202. 716-853-5356
serves Erie, Genessee, Niagara, Wyoming

Mid-Hudson Heart Chapter, 72 Main St., Kingston, New York, 12401.
914-338-8517
serves Columbia, Greene and Ulster

Nassau Heart Association, 365 Willis Ave., Mineola, New York, 11501.
516-741-5522

New York State Heart Assembly, Inc., 39 S. Main St., New City, New York,
10956. 914-634-4987
serves Rockland

Northern New York Heart Association, 431 Washington St., Watertown, New
York, 13601. 315-782-1791
serves Franklin, Jefferson, Lewis, Oswego, and St. Lawrence

Orange County Heart Association, 469 Broadway, Newburgh, New York, 12515.
914-561-2950
serves Orange and Sullivan

Southern Tier Heart Association, 374 W. Church St., Elmira, New York, 14901.
607-734-2939
serves Chemung, Schuyler, Steuben, Tioga, Tompkins

Suffolk County Heart Association, 127 Atlantic Ave., Blue Point, New York,
11715. 516-363-6200

Westchester Heart Association, Purchase St., Purchase, New York, 10577.
914-946-6367
serves Westchester and Putnam

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